1060.

SUPREME COURT OF THE UNITED STATES.

No. 236.

ARTEMAS L. BROOKS, IGNATIUS TYLER, WILLIAM W. WOODWORTH, AS ADMINISTRATOR OF WM. WOODWORTH, DECEASED, AND ALSO AS GRANTEE, AND JAMES G. WILSON, APPELLANTS,

vs.

JOHN FISKE AND NICHOLAS G. NORCROSS, DOING BUSINESS UNDER THE FIRM OF FISK & NORCROSS.

APPEAL FROM THE CIRCUIT COURT, UNITED STATES, FOR THE DISTRICT OF MASSACHUSETTS.

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UNITED STATES OF AMERICA.
Massachusetts district.

October term, 1851.

At a circuit court of the United States, begun and holden at Boston, for the first circuit and district of Massachusetts, on Wednesday, the fifteenth day of October, in the year of our Lord one thousand eight hundred and fifty-one—

Before the honorable Benjamin R. Curtis, associate justice; honorable Peleg Sprague, district judge.

In equity.

ARTEMAS L. BROOKS et als., complainants,
vs.
JOHN FISKE et al., respondents.

The bill of complaint in this cause was filed in the clerk's office, on the thirtieth day of January, A. D. eighteen hundred and fifty, and is in the words following, to wit:

To the judges of the circuit court of the United States, for the district of Massachusetts.

Parties.

Artemas L. Brooks and Ignatius Tyler, both of Lowell, in said district, William W. Woodworth, of Hyde Park, in the northern district of New York, esquire, as he is the administrator of the late William Woodworth, of city of New York, in the southern district of New York, gentleman, deceased, and as he is the grantee of certain exclusive privileges, under and pursuant to the acts of Congress hereinafter set forth, and James G. Wilson, of the city of Philadelphia, gentleman, bring this bill of complaint against John Fiske, of Bangor, State of Maine, and Nicholas G. Norcross, of Lowell, aforesaid, planers, &c., doing business under the firm of Fiske & Norcross.

Application for letters patent.

And thereupon your orators complain and say, that William Woodworth, above named, a citizen of the United States, being the true and original inventor of a new and useful machine, not known or used before his application for letters patent, did apply to the Secretary of State of the United States for letters patent for such invention; and having fully and in all respects complied with all the requisitions of the law in that behalf, and especially having made oath that he verily believed himself to be the true inventor and discoverer of such machine; and having also paid into the Treasury of the United States the sum of thirty dollars, and delivered a receipt for the same, and presented to the Secretary of State of the United States a petition, setting forth his desire to obtain an ex-

clusive property in the said machine, and praying that letters patents might for that purpose be granted to him ; and having also delivered and filed in the office of the said Secretary of State, a written description of his said invention and discovery, and of the manner of using the same, and accompanied the same with drawings thereof and written references, in such full, clear, and exact terms, as to distinguish the same from all other things before known, and so as to enable any other person, skilled in the art with which the said invention is most nearly connected, to make and use the same, which said description was duly signed by the said William Woodworth, and attested by two witnesses ; and the said Secretary of State did thereupon cause letters patent to be made out in the name of the United States of America, in due form of law in all respects, bearing date on the twenty-seventh day of December, in the year of our Lord one thousand eight hundred and twenty-eight, whereby was granted to the said William Woodworth, his heirs, administrators or assigns, for the term of fourteen years from the date thereof, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said machine, which is entitled, in the said letters patent, "a new and useful improvement in the method of planing, tongueing, grooving, and cutting into mouldings, or either, plank, boards or any other material, and for reducing the same to an equal width and thickness, and also for facing and dressing brick, and cutting mouldings on, or facing metallic, mineral or other substance ;" and the said letters patent having been duly approved by the Attorney General, and signed by John Quincy Adams, the President, and countersigned by Henry Clay, the secretary of State of the United States, and the said Secretary of State having caused the seal of the United States to be thereto affixed, and the same having been duly recorded, were issued and delivered unto the said William Woodworth, all of which will more fully appear in and by the said letters patent, or a copy thereof duly certified by the Commissioner of Patents, to which, for greater certainty, your orators crave leave to refer.

Grant of the letters patent.

Date, 27th of December, 1828.

Title.

And your orators further show unto your honors, that afterwards, on or about the ninth day of February, in the year of our Lord eighteen hundred and thirty-nine, the said William Woodworth departed this life at the city of New York, aforesaid, where he was then resident ; and thereupon afterwards, on or about the fourteenth day of February, in the year of our Lord, eighteen hundred and thirty-nine, administration of the goods and estate which were of the said William Woodworth at the time of his decease, was duly granted by the surrogate of the county of New York, having jurisdiction in the premises, unto your orator, William W. Woodworth, son and one of the heirs of the said William Woodworth, deceased, and your orator, William W. Woodworth, thereupon took upon himself that trust.

Death of Wm. Woodworth, and appointment of administrator.

1st extension of the term.

And afterwards, on or about the twentieth day of July, in the year of our Lord eighteen hundred and forty-two, your orator, William W. Woodworth, in his said capacity, made application in writing to the Commissioner of Patents of the United States, setting forth that he desired an extension of the said letters patent and the grounds thereof; and having paid the sum of forty dollars to the credit of the treasury of the United States, and the said Commissioner having caused public notice of such application to be given according to law, and the Secretary of State and the Commissioner of Patents and the Solicitor of the Treasury of the United States having met, as the board designated by law for such purpose, on the first day of September, in the year last aforesaid, at the Patent office, in Washington, being the time and place appointed for such meeting in the said public notice, did then and there proceed to hear and consider the said application, and on diverse days and times to which such hearing and consideration were duly continued by adjournment, did hear and consider the same, and such proceedings were then and there had, that afterwards, on or about the sixteenth day of November, in the year last aforesaid, the said board did adjudge and certify in writing, that, upon hearing of the said matter, it appeared to their full and entire satisfaction, having due regard to the public interest therein, that it is just and proper that the term of the said letters patent should be extended, by reason that the patentee, without neglect on his part, had failed to obtain, from the use and sale of his invention, a reasonable remuneration for the time, ingenuity, and expense bestowed upon the same, and the introduction thereof into use; which said certificate having been duly signed by all the members of the said board, the Commissioner of Patents did thereupon, according to law, renew and extend the said patent, by making a certificate of such extension thereon for the term of seven years from and after the expiration of the said term of fourteen years, for which the said patent was originally granted; which last mentioned certificate, together with the certificate of the said board, having been duly entered of record, your orators crave leave to refer to duly certified copies thereof.

Nov. 16th, 1842, board certified, &c.

Disclaimer, 2d January, 1843.

And your orators further show unto your honors, that on or about the second day of January, in the year of our Lord one thousand eight hundred and forty-three, your orator, William W. Woodworth, being satisfied of the truth of the facts stated and set forth in the disclaimer next hereinafter mentioned, did make disclaimer of all that part of the claim which is contained in the said letters patent which relates to the use of circular saws for reducing floor plank and other materials to a width, and the same having been duly filed and recorded in the Patent office, your orators crave leave to refer to a duly certified copy thereof.

2d extension.

And your orators further show unto your honors, that by an act of Congress passed on the twenty-sixth day of February, eighteen hundred and forty-five, the said ori-

ginal patent was extended for the term of seven years from and after the twenty-seventh day of December, eighteen hundred and forty-nine, and your orators crave leave to refer to the certificate of extension, or a duly certified copy thereof, made by the Commissioner of Patents, under authority of the act aforesaid.

Assignment to Wilson.

And your orators further show, that the said William W. Woodworth, administrator as aforesaid, by his deed, dated on the fourteenth day of March, eighteen hundred and forty-five, and duly recorded in the Patent office at Washington, conveyed and assigned unto the said James G. Wilson all the right, title, and interest of him, the said William W. Woodworth, as administrator aforesaid, in and to the said letters patent and the franchises thereby granted and secured for the said term of seven years, created and extended by the said act of Congress, to wit, for the term of seven years from and after the twenty-seventh day of December, eighteen hundred and forty-nine.

And your orators further show unto your honors, that afterwards doubts being entertained of the correctness and accuracy of the said specification, and the said letters patent being found to be inoperative on account of the said defective specification, the same were duly surrendered; and such surrender having been duly accepted by the Commissioner of Patents, the said Commissioner did in due form of law issue to the said William W. Woodworth, as administrator aforesaid, letters patent bearing date on the eighth day of July, eighteen hundred and forty-five, granting to the said William W. Woodworth, in trust for the heirs-at-law of the said William Woodworth, their administrators, heirs, and assigns, for the residue of the term of twenty-eight years from the said twenty-seventh day of December, eighteen hundred and twenty-eight, the exclusive right and liberty of making, using, and vending to others to be used, the improvement claimed and described in the amended specification, to the letters patent last aforesaid annexed, to which said last mentioned letters patent, or a duly certified copy thereof, your orators crave leave to refer as a part of this their bill.

Surrender and re-issue with amended specification.

And your orators further show, that since the issuing of the said new letters patent to William W. Woodworth, the said Woodworth, by his deed, dated on the ninth day of July, eighteen hundred and forty-five, and recorded in the Patent office aforesaid, granted, assigned, and confirmed, unto the said James G. Wilson and his assigns, all the right and title acquired by him in and by the issue of the said last letters patent with the amended specification as aforesaid.

Confirmation to Wilson.

And your orators further show unto your honors, that by an indenture of two parts, dated the fourth day of June, eighteen hundred and forty-five, by and between the said James G. Wilson and Artemas L. Brooks, of Lowell, in the State of Massachusetts, the said Wilson granted and assigned to the said Artemas L. Brooks and assigns the exclusive right to make and

Wilson to Brooks.

use, and vend to others to construct and use, six of the said patent planing machines, constructed according to the said last letters patent with the amended specification, during the said second extension of the term of seven years, from the said twenty-seventh of December, eighteen hundred and forty-nine, within the city of Lowell aforesaid, and five miles around said Lowell, excepting such parts as are out of the county of Middlesex, and also within said limits to dispose of the plank, &c., dressed by said machine.

And your orators further show unto your honors, that since the issuing of the said new letters patent to the said William W. Woodworth, with the amended specification, the said James G. Wilson, by his deed dated on the twenty-fourth day of January, eighteen hundred and fifty, and duly recorded in the Patent office at Washington, granted, assigned, and confirmed unto the said Artemas L. Brooks and his assigns, all the rights and privileges conveyed to him, the said Brooks, by the indenture aforesaid, by and between the said Wilson and the said Brooks, and dated on the fourth day of June, eighteen hundred and forty-five.

Confirmation to Brooks.

And your orators further show unto your honors, that the said Artemas L. Brooks did, by his deed dated on the twenty-eighth day of January, eighteen hundred and fifty, and duly recorded in the Patent office, assign and convey unto Ignatius L. Tyler, of Lowell, and his assigns, for the term of four years, from and after the twenty-seventh day of December, eighteen hundred and forty-nine, one-half of the exclusive rights conveyed and confirmed to the said Brooks, by James G. Wilson aforesaid, by deed dated on the twenty-fourth day of January, eighteen hundred and fifty, viz., one undivided half of the right to construct, use, and vend to others to make and use, for the term aforesaid, six of the aforesaid planing machines, in the city of Lowell, and five miles around the same.

Brooks to Tyler.

And your orators further show unto your honors, that the aforesaid John Fiske, of Bangor, State of Maine, and Nicholas G. Norcross, of Lowell aforesaid, are now using one of the said machines, substantially the same in construction and mode of operation as the planing machine in the said letters patent mentioned, the exclusive right to make, use, and vend which is by law vested in your orators, and that the said defendant used the same for some time past, but how long in particular your orators are not informed and cannot set forth, but pray that the said defendant may discover and set forth the same, and thereby the said defendants did and still do infringe upon the exclusive privileges intended to be secured to your orators by the said letters patent.

Piracy.

And your orators further show unto your honors, that heretofore, viz., at the term of this honorable court, begun and holden at Boston, within and for the district of Massachusetts, on the fifteenth day of October, in the year of our Lord one thousand eight hundred and forty-three, certain persons named Washburn & Brown, impleaded one James Gould in an action at law, wherein

Action at law.

they declared against him in a plea of trespass on the case, for a violation of the exclusive privileges of your orators, Washburn & Brown, secured to them by the letters patent and grant aforesaid, by using a machine, substantially the same in its construction and mode of operation, as the said planing machine invented by the said William Woodworth; and thereupon the said suit at law having been duly continued from said term to the term begun and holden at Boston, within and for the said district of Massachusetts, on the fifteenth day of May, in the year of our Lord one thousand eight hundred and forty-four, the said Gould having pleaded that he was not guilty in manner and form as the said plaintiffs have declared against him, and issue being joined thereon, the cause was committed to a jury, who returned their verdict therein upon oath, and found that the said Gould was guilty in manner and form as the said plaintiffs had declared against him, and assessed damages in the sum of fifty dollars. And afterwards, at the same term of the said court, a motion for a new trial of the said action having been made by the said Gould, and overruled by the court, judgment was rendered on the said verdict in favor of the said plaintiffs for their aforesaid damages and costs.

And your orators further show unto your honors, that heretofore, to wit, at the term of this honorable court, begun and holden at said Boston, within and for the district of Massachusetts, on the fifteenth day of October, in the year eighteen hundred and forty-seven, the said William W. Woodworth impleaded Rudolphus C. Edwards, James H. Edwards, and Cyrus Smith, in an action at law for a violation of the aforesaid exclusive privileges secured to the said William W. Woodworth, by using a planing machine substantially the same in its construction and mode of operation as the said planing machine invented and patented by William Woodworth; and such proceedings in the said suit were afterwards had, that at the same term of the court, the said Edwards et al. having pleaded not guilty in manner and form as the plaintiff had declared against them, and issue being joined thereon, the said cause was committed to a jury, who returned a verdict thereon upon oath that the said Edwards and Smith were guilty in manner and form as the plaintiff had declared against them, and assessed damages in the sum of five hundred dollars. And afterwards, at a term of this court, begun and holden on the fifteenth day of May, eighteen hundred and forty-eight, a motion for a new trial of the said cause having been made by the said Edwards and others, it was overruled by the court, and judgment was rendered on the said verdict in favor of said plaintiff in said cause for his said damages and costs.

Second action.

And your orators have requested the said Fiske & Norcross to desist from further using the said machine, and to account with and pay to your orators the damages sustained by them, by reason of the unlawful use of the said machine by the said Fiske & Norcross, or the profits made by them by such use.

Request to desist.

And your orators further show unto your honors, that heretofore, to wit, on the tenth day of July, eighteen hundred and forty-eight, your orators filed a bill praying that the said Fiske & Norcross might account to them for the profits made by them by running planing machines constructed substantially like the planing machines patented by the aforesaid Woodworth; and that the said Fiske & Norcross might be perpetually enjoined from further infringing upon the exclusive rights granted to your orators aforesaid by the letters patent and several assignments aforesaid.

And your orators further aver, that afterwards, to wit, on the sixteenth day of October last aforesaid, such proceedings were had in upon the said bill of injunction that the said Fiske & Norcross, of the one part, and the said Brooks & Tyler, of the second part, signed an indenture, dated the first day of September, eighteen hundred and forty-eight, setting forth that whereas the said bill of complaint had been filed as aforesaid, the said Fiske & Norcross agreed and promised unto the said Brooks & Tyler, that they would, within one month from the date of the said instrument, pay unto the said Brooks & Tyler the full sum of one hundred and twenty-seven dollars ninety-five cents, in full satisfaction of the costs in the aforesaid bill of complaint. The said Fiske & Norcross further agreed and promised to pay to said Brooks & Tyler, within one month from the date of the said instrument, fifty cents upon each and every thousand feet of boards or plank planed by them, or by any of their agents or workmen, previous to August first, eighteen hundred and forty-eight, at Lowell, as charged in said bill of complaint, and by the planing machine alleged to be substantially the same in construction and mode of operation as the Woodworth machine. And said Fiske & Norcross, in order to carry out the full intent and meaning of the said indenture, promised and agreed to render, on demand, to said Brooks & Tyler, a just and true account of all boards planed by them, the said Fiske & Norcross, by machines constructed as aforesaid, at Lowell, at any time previous to the first of August, eighteen hundred and forty-eight.

And it was further agreed by said instrument, that the said Fiske & Norcross, in consideration of their having earnestly complied with the foregoing stipulations, should have free right and license, for the space of one year from the first day of August last aforesaid, to plane, tongue, and groove, by said machinery, any and all lumber actually sawed by them or their workmen upon their premises, and also all such "eastern lumber" as they shall cause to be brought to their said premises; subject however to the condition, that on the first day of January, eighteen hundred and forty-nine, they should render to the said Brooks & Tyler a true account of all lumber so planed by them or their workmen, between the first of August and first of January aforesaid, and within fifteen days thereafter pay to your orators fifty cents for each and every thousand feet of boards so planed by them, and furthermore to render a like account and make similar payment to your orators for

all boards, &c., planed as aforesaid during the aforesaid term of one year.

Whereupon, and in consideration of which conditions, it was agreed that said Brooks and Tyler should stop all further proceedings in regard to said bill of complaint, and said bill was dismissed accordingly.

To the end, therefore, that the said defendants may, if they can, show cause why your orators should not have the relief hereby prayed, and may, upon their several and respective corporal oaths, and according to the best and utmost of their several and respective knowledge, remembrance, information and belief, full, true, direct, and perfect answer make to such of the several interrogatories hereinafter numbered and set forth, as by the note hereunder written they are respectively required to answer; that is to say:

Interrogatories.

1. Whether the said letters patent were granted and issued as above stated?

2. Whether the said letters patent were renewed and extended, as is above stated?

3. Whether the disclaimer aforesaid was filed as is above stated?

4.

5. Whether the grants by the said William W. Woodworth to the said Wilson were respectively made as is above stated?

6. Whether the said actions at law were commenced and prosecuted, and the said verdict and judgment recovered, as is above stated?

7. Whether the said defendants have at any time, and when, and during what period of time, either severally and each by himself or jointly with any and what other person or persons used any planing machine, and where or whether or no the same was not substantially the same, in its construction and mode of operation, as the said planing machine of the said William Woodworth, and how the same differed therefrom, if at all?

8. Whether or no such planing machine was used to plane boards for the use of the said defendants, or either of them, or for customers and the public generally; and, if the former, whether or no any, and if any, how much, cost and expense was saved by means of such machine; and if the latter, how much profit has been realized therefrom, and what quantities of boards or other material have been so planed, and at or after what rates or prices, and what expenses were incurred, in the operation of planing?

9. Whether the grants to the said Artemas L. Brooks and to the said Ignatius Tyler were respectively made as is above stated?

10. Whether the said bill of complaint was filed by the said Brooks & Tyler, and others, against the said Fiske & Norcross, and whether the said agreement was made and entered into by them and the complainants in this bill, as is above stated?

11. Whether the said planing machine referred to in the said agreement was not substantially the same in construction and mode of operation as the planing machine of the said William Woodworth, and how the same differed from Woodworth's planing machine, if at all?

1845.

12. Whether the said Fiske & Norcross used the said machine, described in said agreement, until the first day of August, eighteen hundred and forty-nine, aforesaid?

And that the said defendants may answer the premises, and that they may be decreed to account for and pay over to your orators all such gains and profits as have accrued to them from using the said machines since the expiration of the said original letters patent, and that they may be restrained by an injunction issuing out of this honorable court, or issued by one of your honors, according to the form of the statute in such case made and provided, from using or vending any one or more of the said machines, substantially the same in its construction and mode of operation as the said patentee's planing machine; and that the machine or machines now in the possession of the said defendants, or under their control, may be destroyed or delivered up to your orators; and for such further or other relief as the nature of this case may require, and to your honors may seem meet.

May it please your honors to grant unto your orators not only a writ of injunction conformable to the prayer of this bill, but also a writ of subpœna, directed to the said John Fiske and Nicholas G. Norcross, planers, &c., doing business in Lowell aforesaid, under the firm of Fiske & Norcross, and commanding them and each of them to appear and answer unto this bill of complaint, and to do and receive what to your honors shall seem meet.

C. P. & B. R. CURTIS,
Of counsel with the pl'ffs.
ARTEMAS L. BROOKS.

DISTRICT OF MASSACHUSETTS.

Jan. 30th, 1850. Personally appeared before me the above named Brooks, and made oath that the matters and things above stated are true, so far as they are stated of his own knowledge; and that so far as they are stated on the information of others, he believed them to be true.

EDWARD G. LORING,
Commissioner.

And afterwards, at the same term, to wit, on the first day of April, A. D. eighteen hundred and fifty, the answer of Nicholas G. Norcross, one of the respondents in this cause, was filed, and is in the words following, to wit:

CIRCUIT COURT OF THE UNITED STATES,
For the district of Massachusetts.

BROOKS AND ANOTHER
vs. } In equity.
FISKE AND ANOTHER.

The joint and several answer of John Fiske, of Bangor, in the State

of Maine, and Nicholas G. Norcross, of Lowell, in the State of Massachusetts, defendants, to the bill of complaint of Artemas L. Brooks and Ignatius Tyler, of said Lowell, William W. Woodworth, of Hyde Park, in the State of New York, and James G. Wilson, of Philadelphia, in the State of Pennsylvania, plaintiffs.

These defendants reserving to themselves, jointly and severally, all right of exception to said bill of complaint, for answer thereto say as follows:

1. In answer to the first interrogatory these defendants say, that they believe, upon information, that said letters patent were granted and issued as alleged in the plaintiffs' bill, but they have no knowledge thereof, and require the plaintiffs to prove the same.

2. In answer to the second interrogatory these defendants say, that they believe, upon information, that said letters patent were renewed and extended as alleged in the plaintiffs' bill, but they have no knowledge thereof, and require the plaintiffs to prove the same.

3. In answer to the third interrogatory these defendants say, that they believe, upon information, that said disclaimer was filed as alleged in the plaintiffs' bill, but they have no knowledge thereof, and require the plaintiffs to prove the same.

4. (Omitted in bill.)

5. In answer to the fifth interrogatory these defendants say, that they have no knowledge or belief as to the grants mentioned in this interrogatory.

6. In answer to the sixth interrogatory these defendants say, that they believe, upon information, that said actions at law were commenced and prosecuted to judgment, as alleged in the plaintiffs' bill, but for certainty thereof they refer to the records of this honorable court; and these defendants further say, that since the recovery of the judgments aforesaid, a verdict and decree against the validity of the said Woodworth patent have been rendered in the circuit court of the United States, for the district of Maryland.

7. In answer to the seventh interrogatory these defendants say, that they have jointly, under the firm of Fiske & Norcross, and not otherwise, used one planing machine, and no more, since December 25th, 1849, at their mill in said Lowell, and no where else; but they believe and therefore aver that said machine is not the same in principle and mode of operation as the said Woodworth machine, but is substantially different therefrom, and contains none of the combinations claimed in the said Woodworth patent, but is a new and different invention, secured to said Norcross by letters patent duly granted and issued to him by the United States of America, on the twelfth day of February, in the year one thousand eight hundred and fifty, to which, or a duly certified copy thereof, they refer as an exhibit with this their answer, for the purpose of showing the substantial difference between said machines.

8. In answer to the eighth interrogatory these defendants say, that they have used their said machine to plane boards to sell to customers for lumber, generally; that they have planed two hundred and sixty-

six thousand six hundred ninety-five square feet of boards, for an average rate of two dollars per thousand feet, at the average expense of one dollar and fifty cents per thousand feet, and have realized therefrom about fifty cents per thousand feet as profits.

9. In answer to the ninth interrogatory these defendants say, that they believe, upon information, that some grants were made to said Brooks and to said Tyler, as alleged in the plaintiffs' bill, but they know not the terms or legal effect thereof, and require the plaintiffs to prove the same.

10. In answer to the tenth interrogatory these defendants admit that said bill of complaint was filed, and said agreement made, as alleged in the plaintiffs' bill.

11. In answer to the eleventh interrogatory these defendants say, that the machine referred to in said agreement as used by them was constructed according to a patent duly granted and issued by the United States of America to one James H. Hutchinson, July 16, 1839; but they admit that it embraced the first combination claimed in the said Woodworth patent, as amended subsequent to the date of the said Hutchinson patent.

12. To the twelfth interrogatory the defendants answer yes.

And these defendants further answering say, that they believe, and therefore aver, that the said Woodworth patent is void in part for want of novelty in the first claim therein, to wit, for the employment of rotating planes in combination with rollers or any analogous device to keep the board in place, the same thing substantially having been before patented in France, to wit, in 1817 and 1818, by Sir Louis Victor, Joseph Mari Roguin, and in 1825 by Sir Leonore Thomas de Manneville, and described in the printed publication commonly called Brevets d'Inventions, vol. 23, pages 207 to 212, plates 27 and 28, and vol. 41, pages 111 to 116, plate 12; and these defendants refer also to the Hill machine, mentioned in the said patent of Norcross, as publicly used by Joseph Hill, of Lynn, prior to the pretended invention of the said combination by the said William Woodworth, deceased.

And these defendants further say, that they believe, and therefore aver, that the said patent issued to William W. Woodworth July 8th, 1845, is not for the same invention as the original patent issued to William W. Woodworth Dec. 27, 1828, exclusive of the part disclaimed January 2, 1843, as alleged in the plaintiffs' bill.

And these defendants further answering say, that they are informed by numerous and able experts, and they verily believe, and therefore aver, that the machine used by them, and patented by said Norcross as aforesaid, is not an infringement of the said Woodworth patent, nor of any rights of the plaintiffs under the same, and they pray that the question of infringement may be tried by a jury under the direction of the court.

Without this, that there is any other matter, cause, or thing, in the plaintiffs' said bill of complaint contained, material or necessary for these defendants, or either of them, to make answer unto, and not

herein or hereby well and sufficiently answered, confessed, traversed, and avoided, or denied, is true, to the knowledge or belief of these defendants or either of them; all which matters and things these defendants are ready and willing to aver, maintain, and prove, as this honorable court shall direct, and humbly pray to be hence dismissed, with their reasonable costs and charges in this behalf most wrongfully sustained.

J. GILES, *Counsel for defendants.*
N. G. NORCROSS.

And on this first day of April, before me, came N. G. Norcross, above signed, who being duly sworn, made solemn oath that the facts stated in the foregoing answer, as of his own knowledge, are true, and those stated on the information of others he believes to be true.

Witness my hand—

CHARLES LEVI WOODBURY,
Master in chancery.

Circuit court of the United States, district of Massachusetts.

And afterwards, at the same term, to wit, on the third day of April, A. D. eighteen hundred and fifty, the joint and several answer of John Fiske and Nicholas G. Norcross, the respondents as aforesaid, was filed, and is in the words following, to wit:

Circuit court of the United States, for the district of Massachusetts.

BROOKS & ANOTHER
vs.
FISKE & ANOTHER. } In equity.

The joint and several answer of John Fiske, of Bangor, in the State of Maine, and Nicholas G. Norcross, of Lowell, in the State of Massachusetts, defendants to the bill of complaint of Artemas L. Brooks and Ignatius Tyler, of said Lowell, William W. Woodworth, of Hyde Park, in the State of New York, and James G. Wilson, of Philadelphia, in the State of Pennsylvania, plaintiffs.

These defendants, reserving to themselves, jointly and severally, all right of exception to said bill of complaint, for answer thereto say, as follows:

1. In answer to the first interrogatory these defendants say, that they believe, upon information, that said letters patent were granted and issued as alleged in the plaintiffs' bill, but they have no knowledge thereof, and require the plaintiffs to prove the same.

2. In answer to the second interrogatory these defendants say, that they believe, upon information, that said letters patent were renewed and extended as is alleged in the plaintiffs' bill, but they have no knowledge thereof, and require the plaintiffs to prove the same.

3. In answer to the third interrogatory these defendants say, that they believe, upon information, that said disclaimer was filed, as al-

leged in the plaintiffs' bill, but they have no knowledge thereof, and require the plaintiffs to prove the same.

4. (Omitted in bill.)

5. In answer to the fifth interrogatory these defendants say, that they have no knowledge or belief as to the grants mentioned in this interrogatory.

6. In answer to the sixth interrogatory these defendants say, that they believe, upon information, that said actions at law were commenced and prosecuted to judgment as alleged in the plaintiffs' bill, but for certainty thereof, they refer to the records of this honorable court; and these defendants further say, that since the recovery of the judgments aforesaid, a verdict and decree against the validity of the said Woodworth patent have been rendered in the circuit court of the United States for the district of Maryland.

7. In answer to the seventh interrogatory these defendants say, that they have jointly, under the firm of Fiske & Norcross, and not otherwise, used one planing machine, and no more, since December 25th, 1849, at their mill in said Lowell, and no where else; but they believe, and therefore aver, that said machine is not the same in principle and mode of operation as the said Woodworth machine, but is substantially different therefrom, and contains none of the combinations claimed in the said Woodworth patent, but is a new and different invention, secured to said Norcross by letters patent duly granted and issued to him by the United States of America, on the twelfth day of February, in the year one thousand eight hundred and fifty, to which, or a duly certified copy thereof, they refer as an exhibit with this their answer, for the purpose of showing the substantial difference between said machines.

8. In answer to the eighth interrogatory these defendants say, that they have used their said machine to plane boards to sell to customers for lumber generally; that they have planed two hundred and sixty-six thousand six hundred and ninety-five square feet of boards, for an average rate of two dollars per thousand feet, at the average expense of one dollar and fifty cents per thousand feet, and have realized therefore about fifty cents per thousand feet as profits.

9. In answer to the ninth interrogatory these defendants say, that they believe, upon information, that some grants were made to said Brooks and to said Tyler, as alleged in the plaintiffs' bill, but they know not the terms or legal effect thereof, and require the plaintiffs to prove the same.

10. In answer to the tenth interrogatory these defendants admit, that said bill of complaint was filed, and said agreement made, as alleged in the plaintiffs' bill.

11. In answer to the eleventh interrogatory these defendants say, that the machine referred to in said agreement, as used by them, was constructed according to a patent duly granted and issued by the United States of America to one James H. Hutchinson, July 16, 1839; but they admit that it embraced the first combination claimed in the said

Woodworth patent, as amended subsequent to the date of the said Hutchinson patent.

12. To the twelfth interrogatory the defendants answer, yes.

And these defendants further answering say, that they believe, and therefore aver, that the said Woodworth patent is void in part, for want of novelty in the first claim therein, to wit, for the employment of rotating planes in combination with rollers or any analogous device to keep the board in place; the same thing substantially having been before patented in France, to wit, in 1817 and 1818, by Sir Louis Victor Joseph Mari Roguin, and in 1825, by Sir Leonore Thomas de Manneville, and described in the printed publication, commonly called Brevets d'Inventions, vol. 23, pages 207 to 212, plates 27 and 28, and vol. 41, pages 111 to 116, plate 12; and these defendants refer also to the Hill machine, mentioned in the said patent of Norcross, as publicly used by Joseph Hill, of Lynn, prior to the pretended invention of the said combination by the said William Woodworth, deceased.

And these defendants further say, that they believe, and therefore aver, that the said patent, issued to William W. Woodworth July 8th, 1845, is not for the same invention as the original patent issued to William Woodworth, Dec. 27, 1828, exclusive of the part disclaimed, Jan. 2, 1843, as alleged in the plaintiffs' bill.

And these defendants further answering say, that they are informed by numerous and able experts, and they verily believe, and therefore aver, that the machine used by them and patented by said Norcross as aforesaid is not an infringement of the said Woodworth patent, nor of any rights of the plaintiffs under the same; and they pray that the question of infringement may be tried by a jury under the direction of the court.

Without this that there is any other matter, cause, or thing, in the the plaintiffs' said bill of complaint contained, material or necessary for these defendants or either of them to make answer unto, and not herein or hereby well and sufficiently answered, confessed, traversed and avoided, or denied, is true, to the knowledge or belief of these defendants, or either of them; all which matters and things these defendants are ready and willing to aver, maintain, and prove, as this honorable court shall direct; and humbly pray to be hence dismissed with their reasonable costs and charges in this behalf most wrongfully sustained.

J. GILES, *Counsel for defendants.*
JOHN FISKE,
N. G. NORCROSS.

UNITED STATES OF AMERICA,
Circuit court, district of Maine, ss.

On this twenty-ninth day of March, A. D. 1850, personally appeared the said John Fiske, and made oath that he has read the foregoing answer by him subscribed, and knows the contents of it,

and that the same is true of his own knowledge, except the matters stated to be on his information or belief; and that as to those matters he believes them to be true.

Before me— FRED. HOBBS,
Commissioner of the United States circuit court, for Maine district.

UNITED STATES OF AMERICA,
District of Massachusetts.

April 3, 1850. Then and there personally appeared the said N. G. Norcross, and made oath that he has read the foregoing answer by him subscribed, and knows the contents of it, and that the same is true of his own knowledge, except the matters stated to be on his information or belief, and that as to those matters he believes them to be true.

Before me— CHARLES SUMNER
Commissioner.

Specification of Nicholas G. Norcross's patent, referred to in the respondent's answer.

The schedule referred to in these letters patent, and making part of the same. To all persons to whom these presents shall come:

Be it known that I, Nicholas G. Norcross, of the county of Middlesex, and State of Massachusetts, have invented an improved machine for planing boards, plank, or various other articles; and I do hereby declare that my said invention is fully described and represented in the following specification and accompanying drawings, letters, figures, and references thereof.

In the month of April, or thereabouts, in the year eighteen hundred and twenty-eight, or some time previous thereto, as I have been informed, (and as I believe it will appear by reference to certain affidavits filed in the United States court at Baltimore, as well as in some other courts of the United States,) one Hill, (Daniel Hill, I think, was his name, although of this I am not positive,) now or late of Stoneham, or thereabouts, in the State of Massachusetts, invented and put in successful operation a machine for planing boards. My invention, hereinafter described, contains an improvement on the said machine, and renders it capable of reducing or planing a board to an equal thickness throughout its length. The machine of the said Hill was capable of planing or reducing a board on one side, or removing from such side a stratum or layer of wood of an equal thickness, and so as to leave the board of an equal thickness previous to and at the time of its reduction by the said machine. My invention also contributes greatly towards the protection from fire of any building in which my improved machine may be placed and operated, thereby not only effecting a reduction of risk of loss, but a consequent reduction in the price of insurance. It

has been very difficult, if not impossible, to procure insurance on planing mills, on account of the constant danger of their taking fire, owing to the great amount of shavings made by the rotary planes, and such shavings being scattered about on the machinery and over the floor of the room in which the planing machine may be at work. The destruction of planing mills by fire is such a common occurrence that most, if not all, insurance offices deem insurance on them so hazardous, as to either cause them to utterly refuse to insure on them, or to do so at a very exorbitant premium. As herein before mentioned, my invention renders such mills comparatively safe, and thereby not only protects property, but life.

Before proceeding to describe my invention, I will remark, that I deem it proper to point out the principal peculiarities of the said Hill's machine, and for this purpose I have represented it in figures 1 and 2 of the accompanying drawings; the former figure being a top view of it, while the latter is a vertical, central, and longitudinal section of it, as I have seen it exhibited in model.

In the said figures, that is, in either one or both of them, as the same may appear, *A* is a table, frame, or bench, of which *BB* is the top board or platform on which the plank or board to be planed or reduced was made to rest and move during the operation of planing it, the said plank being represented at *C*. There was an opening transversely made through the platform, *BB*, as seen at *D*. A rotary cutter, or plane, *E*, was placed below and within the said opening, and made to revolve in such manner as to carry its cutter or cutters against the under side of the plank, *C*, and reduce it or remove the wood therefrom.

F and *G* were two feed rollers, arranged transversely of the machine, and in other respects, as seen in figures 1 and 2. One of them, viz., *F*, was put in revolution by means of a pulley, *H*, and a band which proceeded from some suitable mover. The other roller, *G*, was arranged within a frame, consisting of two wooden spring bars, *II*, united together by transverse bars or pieces, *KL*, the latter of which bars had journals at its ends, which journals were supported and turned in bearings made in or on the tops of two posts or standards, MM^1, extended upwards from the frame, as seen in the drawings.

Two other posts or standards, NN^1, also extended up from the main frame, and between the cylinder *G* and the parts MM^1, the said two standards NN^1 being connected together by a cross bar, *O*, placed somewhat above the spring bars, II^1. A wedge, *P*, or P^1, was driven between the bar *O* and each of the spring bars, and for the purpose of pressing the roller, *G*, down upon the plank, while this said plank rested on the lower roller, *F*. From the under side of the transverse piece, *K*, a spring plate, *R*, extended or was pressed upon the plank, *C*, over or in the vicinity of the rotary cutter. By means of the feed rollers, *F* and *G*, the plank was advanced or moved upon the bench, *BB*, and over the rotary plane; the said plank being kept down upon the bench, or from rising up therefrom, by means of the pressure upon it of spring, *R*, and the upper roller, *G*, which yielded to the varia-

1069.

tions of thickness of the plank, as it passed under them. The platform, *BB*, preserved the board from being drawn downwards and towards the rotary cutter in a direction from its planed to its unplaned surface. Such is, or was, in substance, the machine of the said Hill; and, having explained it, I shall now proceed to specify my invention.

Figure 3 of the accompanying drawings exhibits a top view of my improved planing machine. Figure 4 is an elevation of one side of it. Figure 5 is an elevation of the other side of it. Figure 6 is a central, longitudinal, and vertical section of it. Figure 7 is a transverse and vertical section of it, taken through the axis of the rotary planing cylinder.

In the said drawings of figures 3, 4, 5, 6, and 7, *A* represents the main frame of the machine, which may be constructed in any proper manner, and of wood, or any other suitable material. *B B*^{1} is a stationary platform, or bed, fixed on the top part of the main frame, and made in two parts, *B* and *B*^{1}, placed at a suitable distance asunder, to admit the rotary plane, cylinder, or cutter, *E*, to be placed and made to operate between them. The said rotary plane has its journals, *a a*, figure 7, supported in boxes, *b b*, confined in a frame composed of two vertical end frames, *c d*, and a horizontal and transverse rest, or bar, *f*, the frames, *c d*, being respectively supported in stationary guide-frames, or puppets, *g h*, fastened on the main frame, and so made as to allow of a free and simultaneous vertical movement either upwards or downwards of the said frames, *c d*, the rest bar, *F*, and the planing cylinder, *E*. In other words, the said planing cylinder and the said rest bar should be so connected together by mechanism, that when one rises the other shall rise in the same proportion, and when one falls or is depressed, the other shall fall or be depressed in the same degree.

The distance between the circle of revolution of the rotary plane and the underside of the rest bar determines the thickness of a plank to be planed; and, for the sake of being able to plane a plank or board to any desirable thickness, as circumstances may require, either the rest bar, *f*, or the planing cylinder, or both, may be provided with suitable mechanical contrivances by which their distance apart may be adjusted or regulated. The mode of accomplishing this I have exhibited in the drawings. It consists of screws, *k l*, tapped into and through the top parts of the frames, *c d*, and made to screw against the rest bar. It further consists of one or more blocks, *m n*, placed underneath each end of the rest bar, and between it and the adjacent box of the journal of the rotary plane; the said block or blocks being of the proper thickness to carry the circle of revolution of the rotary plane at the required distance from the rest bar. I, however, do not intend to limit my invention to the employment of such or any other mode of adjusting the distance of the rest bar from the rotary planing cylinder, as I intend to employ any method which will answer the purpose. The rest bar and the planing cylinder should be so supported by their guide frames, as to freely rise or fall without any improper lateral or endwise vibration or movement. In order to cause the front end of the board

to pass on to the part B^1 of the platform, such part B^1 has the upper surface of it, near the cutting cylinder, bevelled or chamfered down, as seen at x, in figure 6.

In the operation of planing a board, or piece of wood, it passes between the rest bar and the planing cylinder, the latter being drawn or so kept up to the board by the former, as to cause it to reduce the board to an equal thickness throughout its whole extent. The under surface or part of the board is reduced to parallelism with the upper surface of it, which always, throughout the operation, rests against the rest bar, and, in consequence of its being supported on the part B of the platform $B\ B^1$, it elevates the rest bar in accordance with any increase of thickness, and, consequently, causes the rest bar to draw the planing cylinder towards, or up into the board, or in a direction from the unplaned under surface to the planed under surface of the said board.

For impelling the board towards and over the rotary cutting cylinder, we employ one or more sets of feed rollers, $F\ G$. The roller, F, should be made so as to freely revolve on its journals, while in other respects it should be stationary. The other roller, G, should not only be capable of rotating, but of rising and falling, so as to adapt itself to the varying thickness of the board. For this purpose, it is borne down, towards the other roller, by means of one or more springs, or by weighted levers, $U\ U^1$, and suitable bearing rods, such as are in common use for such purpose. The said feed rollers are connected by geers, $m^1\ n^1$. The board, as it passes between them and the rotary cutter cylinder and rest bar, is seen at C, in figure 6.

The main driving shaft is placed as seen at V in the drawings. It is put in motion by any suitable power, and has a large pulley, W, on one end, around which pulley an endless cross belt, X, extends, and from thence passes to and about a small pulley, Y, fixed on one end of a horizontal transverse shaft, z, placed at the opposite end of the main frame, as seen in figures 3, 4, 5, 6. The said shaft revolves in boxes, $a^1\ a^1$, and has two pulleys, $b^1\ b^1$, fixed to it, around each of which one of two endless belts, $c^1\ c^1$, passes, and thence passes around one of two pulleys, $d^1\ d^1$, fixed on the axle or shaft of the rotary cutter cylinder, E, the whole being as seen in the drawings. By such means, the rotary cylinder is put in rapid revolution when the main shaft is made to revolve.

On one end of the axle of the lower feed roller, F, a large geer wheel, e^1, is fixed—the same being made to engage with a toothed pinion, f^1, fixed on one end of a transverse horizontal shaft, g^1, which plays or rotates in boxes, $h^1\ h^1$, and has a pulley, i^1, on its other end. An endless crossed band, k^1, passes around the pulley, i^1, and also around a pulley, l^1, fixed on one end of the driving shaft—the whole being as seen in the drawings. By such means the lower feed roller is revolved when the main shaft is put in rotation.

A horizontal bar, or throat-piece, Y, may be arranged with its upper surface parallel with the under surface of the rest bar, f, and on a level, or a very little above the level, with the extreme upper part of the circle

of revolution of the cutting edge of the cutters of the planing cylinder. The said bar is further arranged in front of the said cylinder, and across the machine, and is fastened firmly at its ends to the frames, *c d*. The board, as it advances beyond the planing cylinder, passes between the bar, *Y*, and the rest, *f*, and is kept up to the rest by means of the said bar.

From the under side of the bench, or platform, *B B*^{1}, and below the rotary cutter cylinder, a box, or conductor, m^2, is made to extend downwards, and to partially enclose the rotary cutter cylinder, *E;* that is to say, the rotary cylinder is arranged within the upper part of the conductor, in such manner that the shavings or wood removed by it from the board shall pass or be thrown into the said conductor. This conductor should be made so close that no shavings or chips can escape from out its sides, while the machine is in operation; the object of it being to collect the shavings, or chips, and preserve them from accidental contact with fire. This conductor may be a close box of itself, or it may lead down and open into a close box, or chamber, formed under it, or under the planing machine; such close box, or chamber, being seen at n^2, in figures 4, 5, 6, and 7. The said conductor, and its chamber, or either of them, may be made in any suitable manner, so as to protect the shavings from fire. They may be made fire-proof, if desirable, and there may be applied to either one or both of them one or more suitable openings, and doors to said openings, for the purpose of removing the accumulated shavings as circumstances may require.

My improvement of applying or arranging the rotary cylinder so as to cut against the under side of the board, and combining with the cylinder, so placed, a fire-protecting conductor, or conductors, and chamber for the collection of the shavings, is of great value, as it not only protects property, but life, from danger of fire. Such a contrivance may also be applied to a rotary cutter, when arranged so as to have its axis either vertical or inclined between a vertical and horizontal position. In planing machines which have the rotary cutter cylinder placed above the board, the shavings are thrown out upon the same, and in various directions, and lodge upon the floor and machine, so as to be very liable to be thrown or carried in contact with a stove, or whatever may cause them to take fire. Besides the above, there is a great deal of fine dust made by such machines, which, floating in the atmosphere, is inhaled into the lungs of workmen, and thereby becomes injurious to health. Such fine dust, to a great extent, if not entirely, is thrown down into the conductor, or fire-protection chamber, and in consequence thereof the operatives are greatly protected thereby from its injurious influences on their lungs.

As the rapid revolution of the rotary cylinder causes it to operate on the air somewhat like a common fire-blower, there will be a current or currents of air, more or less rapid, created in the shaving conductor or chamber. In order that such currents may not be injurious, and be rendered advantageous, a ventilating pipe, a^2, may be inserted in, and made to lead out of, some proper part of either the conductor or the chamber

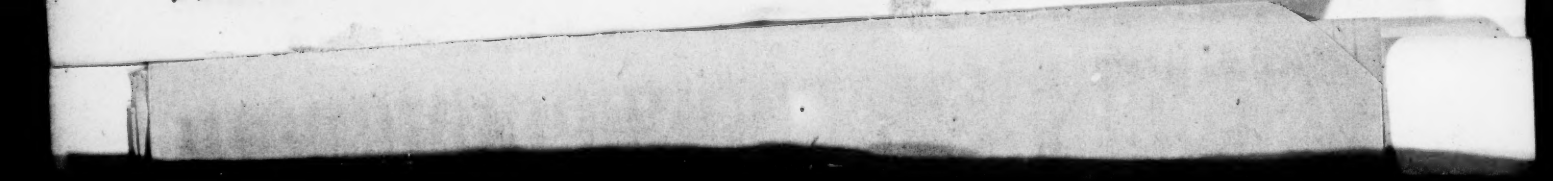
below the same, and be carried therefrom out of the building, or into such an apartment or place as circumstances may require; and when so carried, it may be made to open either into the external atmosphere elsewhere, as may be most convenient. The currents of air which are caused to rush into the conductor, operate to prevent the escape of any dust or shavings out of the top of the same, and they also operate at the same time to force the dust and shavings downwards.

Should the weight of the rotary cutter cylinder, its rest, and their mechanical connexions, not be found sufficient to press the board down against the platform, $B\ B^1$, with the force required in order to perform good work, an additional weight may be placed on the top of the rest, f, or said rest may have one or more springs, or analogous contrivances, adapted to it and the standards, or puppets, $g\ h$.

I would remark, that I lay no claim to the invention of pressure rollers, nor their application in any machinery for the purpose of holding or keeping any particular part of said mechanism against some other parts thereof, while the former may be in motion; nor do I claim the employment of either rotatory or stationary planes, made in any manner, either alone, or in combination with rollers or any analogous device, to prevent the boards from being drawn up by the planes when cutting upwards, or from the reduced or planed to the unplaned surface, for I believe such contrivances have been in common use, and been common property, for at least twenty-one years or more, as will be seen, as I believe, either in whole or in part, by reference to the specification of the patent granted in the United States of America, on the twenty-first day of June, A. D. 1828, to one John Hale, of the county of Worcester, and State of Massachusetts. And as will also be seen, as I believe, either in whole or in part, by reference to the descriptions of patents granted in France, on the ninth of March, A. D. 1825, and twenty-eighth of April, A. D. 1825, to one Manneville, which descriptions are to be found in volume XLI of the French work entitled, "Descriptions des Machines et Procédés consignés dans les Brevets, d'Inventions de Perfectionnement et d'Importation." And as will further be seen, as I believe, either in whole or in part, by reference to the specifications of the patents granted in France, on the fifteenth day of March, A. D. 1817, and the thirtieth day of March, 1818, to one Roguin, the same being described in volume XXIII of the said French work.

Although the herein before mentioned machine of the herein before mentioned Hill could not reduce a board to an equal thickness throughout, when not of such equal thickness, yet it contained a means of preventing the board from being drawn towards the rotary planes, while they were in operation — the said means being the bench, or platform, $B\ B^1$.

In the rotary planing machines, when the rotary cutter cylinder is disposed above the board, while the rest is placed beneath it, it is customary, and generally necessary, to curve convexly and transversely the rest, so that the board, in passing over the same, is curved, the curve being produced by the operation of the pressure rollers. This



will be understood by reference to figure 8, which represents, in section, the rests, rotary cutter, pressure rollers, and board. a^3 being the rest, b^3 the board, c^3 c^3 the pressure rollers, and d^3 the rotary cutter. Such curving of the rest, a^3, in a convex manner, produces a strain on the grain or fibres of the top surface of the board, which not only tends to tear or throw up the fibres more or less, but to loosen the knots, so that they are often disengaged from the boards by the rotary knives of the cylinder. The said mode of forming the rest, and presenting the board to the cutters, becomes necessary in such an arrangement in mechanism, in order to prevent vibration of the board, and consequent inequalities or irregularities in its planed surface.

In my improved machine, instead of making with a convex curve that part of the rest, *f*, (figure 6,) against which the board rests, I construct it with a concave curve on its under side, somewhat as seen in figure 9, which denotes a section of the rest, cutter, and adjacent parts, on a somewhat larger scale than they are shown in figure 6. The part *B* of the bench is formed and applied to the rest, *f*, or made to extend under it in such manner as, in connexion with the concave surface of the rest, to cause the board, as it passes between the rotary cutter, *E*, and the rest, *f*, to bend a little, and present a convave surface to the action of the cutting cylinder. In this way, the fibres or grain of the wood, at or near the surface reduced, become condensed, so as to grasp the knots more firmly, and thereby prevent them, to a great extent, from being thrown out or removed by the cutters, when they pass in contact with them. Besides the advantage of so preserving the knots, the surface of the board, by the fibres of the wood being contracted or condensed, is planed in a much better and smoother manner than it is when the rest is made convex, as before described.

What I claim as my invention is the combination of the rotary planing cylinder, *E*, and the rest, *f*, with mechanism by which the two can be freely moved up or down, simultaneously and independently of the bed, or platform, *B* B^1, or any analogous device, substantially in the manner and for the purpose of reducing a board to an equal thickness throughout its length, all as herein before specified.

I also claim the above described improvement of making the under side of the rest concave, in combination with so extending the part *B* under the rest, *f*, and applying it to the concave part thereof, as to cause the board, as it passes across the rest, to be bent, and presented with a concave surface to the operation of the rotary cutter planing cylinder, substantially as specified; the same being for the purpose herein before mentioned.

In testimony whereof I have hereto set my signature, this thirty-first day of October, A. D. 1849. NICHOLAS G. NORCROSS.

Witnesses—
R. H. EDDY,
F. GOULD.

[For map see original.]

This cause was entered at the October term, A. D. eighteen hundred and forty-nine, of this court, and thence was continued to the May term thereof, A. D. eighteen hundred and fifty, and on the thirtieth day of May, A. D. eighteen hundred and fifty, the complainants aforesaid filed their replication to the answers aforesaid, which is in the words following, to wit:

The replication of Artemas L. Brooks and others, complainants, to the answer of John Fiske and Nicholas G. Norcross, defendants.

This repliant, saving and reserving unto himself all and all manner of advantage of exception to the manifold insufficiencies of the said answer, for replication thereunto saith, that he will aver and prove his said bill to be true, certain, and sufficient in the law to be answered unto, and that the said answer of the said defendant is uncertain, untrue, and insufficient to be replied unto by this repliant; without this, that any other matter or thing whatsoever, in the said answer contained, material or effectual in the law to be replied unto, confesssed and avoided, traversed or denied, is true; all which matters and things this repliant is and will be ready to aver and prove as this honorable court shall direct; and humbly prays as in and by his said bill he hath already prayed.

C. P. & B. R. CURTIS,
Complainants' attorneys.

From the May term, A. D. eighteen hundred and fifty, said cause was continued from term to term, until the present term; and now being at issue as aforesaid, the following proofs filed in said cause were, at the hearing, read and admitted on the part of the complainants:

UNITED STATES OF AMERICA,
New York, ss.

By this public instrument be it known, to all whom the same doth or may in any wise concern, that I, Robert B. Campbell, a public notary, in and for the State of New York, by letters patent under the great seal of the said State duly commissioned and sworn, dwelling in the city of New York, do hereby certify, that on the twelfth, thirteenth, fourteenth, fifteenth, and nineteenth days of March, 1851, the annexed testimony was by me taken and reduced to writing in the presence of the counsel and the witness, and was afterwards copied and by me compared, read over by the witness, and by him signed in my presence; and I further certify, that the counsel of the respective parties agreed that all objections to the revelancy or competency of the questions put by either party, should be taken at the hearing the same as if now voted.

In testimony whereof I have subscribed my name and caused my notarial seal of office to be hereunto affixed, the nineteenth day of March, in the year of our Lord one thousand eight hundred and fifty-one.

Witness attendance 8 days.
" travel 18 miles.

ROBT. B. CAMPBELL,
Notary Public.

CIRCUIT COURT OF THE UNITED STATES,
District of Massachusetts.

BROOKS AND ANOTHER
vs. } In equity.
FISKE AND ANOTHER.

CITY OF NEW YORK,
State of New York, ss.

On this twelfth day of March, in the year eighteen hundred and fifty-one, before me, Robert B. Campbell, a public notary of the State of New York, by letters patent under the great seal of the said State, duly commissioned and sworn, and residing in the city of New York, came the plaintiffs in the above entitled suit, by Charles L. Woodbury, esq., of counsel, who requested to have taken the deposition of John H. Tims, a witness in the above entitled cause produced by the plaintiff; and the defendants in said cause appearing by E. W. Stoughton, esq., of the city of New York, their counsel, the said witness was by me duly sworn and examined on the following interrogatories to him propounded, and made answers, which are written after the several interrogatories.

Question 1st. What is your name, age, and place of residence?

To this interrogatory the witness says: My name is John H. Tims; my age about forty-five; and I reside at Newark, New Jersey.

Question 2nd. What is your occupation; and whether or not have you devoted much attention to the examination of machines with a view of investigating the principles involved in said machines, and their novelty or originality; and for how long have you been in such practice, and whether you deem yourself expert therein?

To this interrogatory the witness says: My occupation is a practical and theoretical mechanic; practical, in executing; and theoretical, in planning and devising machines. I have devoted much attention to the examination of machines with a view of investigating the principles involved in them, and their novelty and originality. I have been in such practice from ten to fifteen years, and I do deem myself expert therein.

Question 3rd. Are you acquainted with the machine called the "Woodworth planing machine;" have you seen it in operation; have you examined the reissued letters patent granted to William Woodworth on the 8th day of July, 1845, and do you understand the construction thereof, and the principles involved therein?

To this interrogatory the witness says: I am acquainted with the machine called the "Woodworth planing machine;" I have seen it in operation. I have examined the said reissued letters patent. I think I do understand the construction of the machine described in those letters patent, and the principles involved therein.

Question 4th. What is the office and use of the pressure rollers as they are described in the said specifications; and what is the use of the bed plate?

To this interrogatory the witness says: The use of the pressure rollers is to keep the plank or board from being raised by the action of the cutters, and also to assist to feed the plank or board to the cutters. And the use of the bed plate is to keep the plank or board a given distance from the cutters.

Question 5th. Are there other modes or methods of producing the effects produced by the pressure rollers of Woodworth's machine? If so, describe some of them, which in your opinion are equivalents for said pressure rollers.

To this interrogatory the witness says: There are other modes of producing the same effect. There may be a bar placed in front of the board as a substitute for the rollers, weighted by levers or any object laid on to it, I mean on the board, in front of the cutter. There may be others, perhaps springs laid on the board which would be yielding, that is bearing on the board, and fastened to some other object. There may be others, one of which is in Mr. Norcross's drawings, which I have seen annexed to a pamphlet; no others occur to me at present. The drawing annexed to the pamphlet appears to me to be a fac simile of the original which I have examined.

Question 6th. Have you seen and examined the letters patent granted to Nicholas G. Norcross, in February, 1850?

To this interrogatory the witness says: Yes, sir, I have. That is to say, I have not read the official specification attached, but I have read it in the pamphlet.

Question 7th. Does or not the patent of Norcross contain any and what arrangement or provision as a substitute for the bed plate and pressure rollers of Woodworth's machine?

To this interrogatory the witness says: I think it does. F fig. 6, is a substitute for the bed plate. B the substitute for the friction roller, to keep the plank from being drawn towards the axis of the knife, and also to allow the inequalities of the plank to pass through, but not to feed the plank to the cutters. That is done by the friction roller G fluted, and F smooth periphery. These feed the plank to the machine, assisted by the lever U, and the weight attached to it. By this arrangment the plank is griped by the revolving of these two rollers alluded to, which cause the plank to feed through the machine.

Question 8th. Is there any substantial difference between the mechanical arrangements of the said two machines, for the purpose of keeping the board or plank in place while being planed; or are they substantially the same, or equivalent? If there is any substantial dif ference, please to state it specifically.

To this interrogatory the witness says: I think there is no very material difference, except it is in mechanical equivalents. I do not discover any substantial difference, except where Brest advances towards the periphery of the wheel, by the edge of the bed advancing as it does towards the periphery of the wheel. In that case it may have less tendency to make a very thin piece of stuff chatter or tremble by the

action of the knives on the stuff. I do not notice any other material difference.

Question 9th. Is in each machine the board planed and reduced to an equal thickness by the same operation of the rotary cutter?

To this interrogatory the witness says: I think it is, or its equivalent.

Question 10th. Is or not in each machine the board held firmly against the rest while being reduced? And is this necessary to reduce to an equal thickness?

To this interrogatory the witness says: It is so held in both machines, and is necessary.

Question 11th. Is or not in each machine the axis of the cutter at a fixed distance from the surface of the rest? And is or not this necessary to reduce to an equal thickness?

To this interrogatory the witness says: The axis of the cutter is in each machine at a fixed distance from the surface of the rest, for any given thickness of a plank or board worked. And this is necessary to reduce to an equal thickness.

Question 12th. Does or not in each machine a device exist to prevent the board being drawn towards the axis of the cutter by the action of the knives? What is the device in each?

To this interrogatory the witness says: Such a device does exist in each. The device in Norcross's is marked B rest. The device in Woodworth's is marked F friction roller. In Woodworth's machine a roller appears, not lettered, placed over the board and nearer the edge of the cutter than F. This appears to me to be for the purpose of preventing the board being drawn towards the cutter. This roller, and not F, performs this office of preventing the board from being drawn towards the cutter.

I would say further, that this is better for thin boards than the rollers F, which are further off, which would answer for thick stuff the same purpose.

Question 13th. Whether or not in each machine can boards of unequal thickness be fed to the cutter? State the devices.

To this interrogatory the witness says: In each they can. In the Woodworth, by the rendering of the friction roller as the board passes between them. In the Norcross, by the rendering of the rest F, and the cutter wheel E, and frame being combined together, by which they rise in consequence of the rough board passing over the bed B, the bed B being stationary, and the frame containing F rest, and E cutter, being allowed to rise and fall freely in consequence of the unevenness of the board in contact with the bed B in passing over it.

Question 14th. Whether *is* not in each machine the devices are self-operating to effect this purpose?

To this interrogatory the witness says: They are, so far as depend on themselves.

Question 15th. Would it constitute an entire change in the principle or mode of operation of the Woodworth machine to connect the bed

and rotating planes in a separate frame, and leave the pressure rollers stationary, and instead of pressing the plank against the bed, to press the bed up against the plank, the bed and rest always retaining the same relative position?

To this interrogatory the witness says: I should think not; I should think one was a mechanical equivalent for another; I should deem that a mere changing of form or position.

Question 16th. What new and useful principle is introduced into the business of planing boards by the Norcross machine, which does not exist in the Woodworth machine?

To this interrogatory the witness says: I do not discover any very material, except the B rest advances nearer the cutters, and would be useful in planing very thin stuff.

The examination was here adjourned until ten o'clock of the 13th instant.

March 13th, 1851. The examination of the same witness was continued.

Question 17th. Have you seen and examined a certified copy from the Patent office at Washington, of an article in the Brevets d'Inventions, vol. 23, pages 207 to 211 inclusive, and the drawings thereto attached and numbered, and do you understand French, or has your examination been made through a translation and the drawing? Do you think you understand the machine?

To this interrogatory the witness says: I have seen such a certified copy and the drawings thereto attached; I do not understand French; my examinations *has* been made through a translation and the drawings; I think I do understand the machine.

Question 18th. Do you find in said copy and drawings a description of the same combination of elements as exist in the Woodworth machine?

To this interrogatory the witness says: I do not.

Question 19th. State wherein the difference is, and what effect this would produce on the results of the two machines.

To this interrogatory the witness says: The difference is, that the machine will not plane the plank to a uniform thickness. The difference is, that there is no arrangement for holding the board so as to reduce it to a uniform thickness, as the cutter wheel cannot be kept down on the board sufficient, when there is an inequality, so as to allow it to produce a board all the way of a thickness, according to the description in the specification.

Question 20th. What is the object and purpose of the bars *ff*, and how do they compare in usefulness with the pressure rollers of Woodworth's machine? State fully.

To this interrogatory the witness says: Their object is to hold the plank down to resist the effect of the cutters in raising and disturbing the plank. They do not compare favorably with the pressure rollers of Woodworth's machine, as they affect the cutter wheel and cause it

to rise and fall from the inequality of the plank, and merely change that inequality to another place on the plank ; while the Woodworth machine leaves no inequality in the thickness of the plank, as the pressure roller is wholly detached from the cutter wheel.

Question 21st. Is the cutter wheel, or the frame on which it rests, secured so that the axis of the cutters shall always have the same relative distance from the rest against which the back side of the board or plank is held when planed?

To this interrogatory the witness says : It has not, if the bar *f* rests on the planks all along in the inequalities of the plank, the presumption being that the bar *f* is inflexible ; also when the resistance to the cutters is greater than the weight of the cutter wheel and its carriage, (as there is no other means of holding it down than its weight that I discover,) the cutter and its carriage will rise off of the ways on which it rolls or slides.

Question 22d. Does the board, or the cutter carriage, move to effect the planing operation in Roguin's machine?

To this interrogatory the witness says : The boards are stationary, the cutter carriage moves to effect the planing.

Question 23d. Turn to the additional improvements of Roguin, in March, 1818, where he speaks of the construction of the carriage, figure 9, and say if the carriage and its load were made so heavy that the bar *f* did not yield to the inequalities of the plank, how would the planing operation be performed on a plank of unequal thickness?

To this interrogatory the witness says : It would plane its surface, but still leave it unequal ; and if the weight is so great that the carriage cannot rise, it would not operate.

Question 24th. Give the numbers of the drawings that you have examined in making the foregoing answers.

To this interrogatory the witness says : I have examined particularly figures 6, 7, 8, and 9 ; the other parts appear to be mere details, which I consider unimportant in comparing the two machines.

Question 25th. Turn to the machine described in the first patent of Roguin, of which the figures 1, 2, 3, and 4 are the drawings, and say how he contemplates arranging his guide, and whether that would yield at all to the inequalities of a plank.

To this interrogatory the witness says : I have discovered the bar *x*, in the drawing figure 2 ; it does not appear exactly how it is connected with the cutter carriage from the drawing or specification ; it appears to me to be unyielding in its relation to the cutters ; it must necessarily go with the cutter, and produce an uneven thickness of the plank. The only description of *x* is, that it is a cross piece called the guide.

Question 26th. Do you find in said original patent and drawings, figures 1, 2, 3, and 4, any arrangements for reducing boards that are unequal to an equal thickness?

To this interrogatory the witness says : I do not.

Question 27th. Do you regard the first machine of Roguin as a useful and practical machine for planing and reducing boards to an equal thickness at the same operation?

To this interrogatory the witness says: I do not.

Question 28th. Do you regard the second or improved machine of Roguin, figures 5 and onwards, as practical and useful for the same purpose?

To this interrogatory the witness says: I do not.

Question 29th. Does or not the cutter's cylinder, in the first machine of Roguin, always retain the same distance from the carriage, and is it moveable?

To this interrogatory the witness says: It appears to be permanent so far as the carriage is concerned.

Question 30th. Does the guide x have any motion which would enable it to adapt itself to the varying thickness of a plank?

To this interrogatory the witness says: I think it does not separate from the cutter carriage, provided the bar x is attached to the cutter carriage, which I am unable to say.

Question 31st. What cutter carriage do you find there, and have you not, in your 29th answer, said that the cutter was fixed and immoveable?

To this interrogatory the witness says: I do not in the drawing find a cutter carriage, but I do in the specification. I think I find by examining the specifications of the first machine that *that* there is no cutter carriage, but a carriage to carry the plank on, only the cutter carriage I referred to was in the specification of the second machine; in that case the bar x would be permanent.

Question 32d. Please to examine a certified copy from the Patent office of the Brevet d' Invention, vol. 41, p. 111, and forward, and the drawings thereto annexed, with the translation furnished to you, and say whether a foot note says that there are no drawings filed of the planing machine, and whether you find any drawings of a planing machine of Manneville.

To this interrogatory the witness says: I see such a foot note, and find no drawings of a planing machine.

Question 33d. Have you read and examined the description of the planing machine of Manneville, and have you made any effort to investigate the same?

To this interrogatory the witness says: I have read the description, and have made an effort to investigate the same.

Question 34th. Could you, as a machinist, construct a planing machine from the description before you?

To this interrogatory the witness says: I think I could not, an operating one.

Question 35th. Whether or not is the planing instrument described sufficiently for you to construct one?

To this interrogatory the witness says: I think it is not, to make one in full.

Question 36th. Whether or not is the mode of operation of the planing instrument sufficiently described to enable you to place it in the machine as contemplated by Manneville?

To this interrogatory the witness says: It is not, if he contemplated making it answer.

Question 37. Can you, from this description, learn how he contemplated using or placing his cutting instruments?

To this interrogatory the witness says: He contemplated using them reciprocating; how he contemplated placing them I am unable to arrange in my mind.

Question 38th. Can you tell from the description how or where he contemplated placing the rollers which should feed the board; if so, how?

To this interrogatory the witness says: I think I can; he contemplated placing them at the edges of the plank.

Question 39th. Is there such description of any means of reducing the plank to an equal thickness as would enable you to build a machine so to do?

To this interrogatory the witness says: First I have said the description is not sufficient to enable one to build a machine. I do not discover anything to my mind satisfactory. It appears to be very obscure, if there is any such description.

Question 40th. Does said description point out or describe the Woodworth combination?

To this interrogatory the witness says: I think it does not.

Question 41st. Does it describe the combination in the Norcross machine?

To this interrogatory the witness says: I think it does not.

The examination in chief here closed.

Being cross examined by the counsel for the defendants:

Question 1st. Do you find in the specifications of Manneville, to which you have referred, a description of a machine for tongueing and grooving boards and plank, and reducing the same to a width?

To this interrogatory the witness says: I do.

Question 2d. With what instruments did he tongue and groove as described?

To this interrogatory the witness says: By circular saws.

Question 3d. With how many, and how in particular were they arranged?

To this interrogatory the witness says: The drawings show eight saws, four horizontal and four vertical; four operate horizontal in cutting the horizontal lines of the tongue. I should say, two cut the horizontal lines of the tongue, and two seem designed to cut the groove on the opposite edge of the plank. Two cut the vertical angles of the tongue, and two reduce the board to a width.

Question 4th. In what manner was the board or plank to be tongued and grooved, in Manneville's machine, to be held firmly down to the bench along which it moved?

To this interrogatory the witness says: By a pressure roller, placed with its axis in a forked arm, the roller extending crosswise the board; to this forked arm is attached a lever and adjustable weight. By this

arrangement the roller would yield, and thus adjust itself to the inequalities of the board which moved under it.

Question 5th. You have stated that in Manneville's planing machine, the plane while in operation was, as you understood it, to reciprocate. Would it not, in thus reciprocating back and forth over the surface of the board to be planed, describe the segment of a circle?

To this interrogatory the witness says: I think it would not. It would seem that the nature of the thing would require guides to guide it straight; the guides would be straight, and necessarily the cutter would follow straight.

Question 6th. Turn your attention to his specifications, and state whether he does not describe two instruments for planing in the same machine, one of which, in moving back and forth, rises above the plane or surface upon which it cuts?

To this interrogatory the witness says: It says, "one of the tool carriers," and I consider this to mean the carrier of the plane iron "which makes a precipitated reciprocating movement, must not rise nor fall, neither move from or towards the board; it is the latter which comes to find it." That I would explain in this way, that this tool carrier has a reciprocating motion in a straight line of one direction, and is prevented from coming to or from the board, that is, rising and falling, by the fact of moving back and forth in straight lines; while on the contrary, the other tool carrier must be susceptible of being moved from or towards the board at will! He describes two instruments for planing in the same machine. I consider the description very unsatisfactory as to the second tool spoken of, unless the board should be planed on both sides at the same time; in that case, this tool carrier may be adjusted to make boards of a uniform thickness. What I understand to mean moving the tool carrier to and from the board at will is, the tool carrier will move to and from the board until it has reduced the unevenness of the board, and the carrier touches the rollers, which it rubs; rubbing against the rollers, it fixes the distance which the cutters will advance into the board. It is obscure, and I want time to answer the last branch of the question.

The examination was here adjourned until ten o'clock of the 14th instant.

March 14th, 1851. The examination of the same witness was continued.

The witness having taken time to answer, says: As far as I can make out, my first explanation is applicable to planing both sides, and the second is, this moveable tool rises and descends perpendicularly, or nearly so, from the plane of the board, if used on the same side as the other plane iron. I now quote from the specifications, "while, on the contrary, the other tool carrier must be susceptible of being moved from or towards the board at will." If it said moved from *and* towards the board instead of *or*, it would be unconditional; or, makes it conditional; to my mind the condition is, it may go to, or go from, but not

go to and from, according to the phraseology of the specification. One of these knives rises above the plane or surface on which it cuts.

Question 7th. Do you understand from Manneville's specifications, that his machine was to plane a board on both sides by the same operation?

To this interrogatory the witness says: I do not understand it does.

Question 8th. In his machine in what manner, and by what device, was the board to be fed through it while being planed?

To this interrogatory the witness says: This is done by two fluted rollers pressing against the sides of the plank to feed the plank to the cutters, and further along it states that there are two other fluted rollers, that receive the plank when finished, and deliver the plank from the machine.

Question 9th. Then these rollers do not feed the plank or board through the machine by pressing upon the edges thereof, do they?

To this interrogatory the witness says: According to one part of the specifications they do not; in another part it says these fluted rollers are placed vertical. I understand by this that the axis of the rollers are placed vertical, while in another part of the specification it appears that the plank lays horizontal.

Question 10th. If the plank was fed through the machine resting on its edge instead of on its side, the axis of the feed rollers would be vertical, would they not, in order to press upon the side of the plank?

To this interrogatory the witness says: They would.

Question 11th. Does he not in his specification, in substance, state that the board to be planed is presented edgeways on rollers, whose axis are placed horizontal?

To this interrogatory the witness says: He does not, as I have discovered.

Question 12th. Does he not in his specification state, that, to smooth or reduce the thickness of a board, it is placed immediately upon rollers, whose axis are horizontal; and does he not farther state, that two fluted cylinders placed vertically and parallel to one another, press the plank upon its two sides?

To this interrogatory the witness says: He does.

Question 13th. For what purpose do these two fluted cylinders, placed vertically and parallel to each other, press the plank upon its two sides.

To this interrogatory the witness says: To feed the plank to the machine.

Question 14th. What part of the plank then is placed immediately upon rollers whose axes are horizontal?

To this interrogatory the witness says: I should infer it to be the edge.

Question 15th. Could it be any other part than the edge while the plank is being pressed upon its two sides by the fluted cylinders?

To this interrogatory the witness says: I should think not.

Question 16th. In order to feed the plank through the machine by

means of these fluted cylinders, must not one of them have been a pressure roller or cylinder?

To this interrogatory the witness says: It must.

Question 17th. Is it not so described?

To this interrogatory the witness says: It is.

Question 18th. In Roguin's first machine, as described by him, did he not use a bench, upon which the carriage, on which the board was placed, moved through the machine?

To this interrogatory the witness says: He used a bench on which the carriage moved.

Question 19th. Did this carriage move upon the top of this bench?

To this interrogatory the witness says: It did.

Question 20th. In this first machine did the planing cylinder hang upon its axis at right angles to, and over the top of, this bench?

To this interrogatory the witness says: It did.

Question 21st. Was this cylinder fixed to or connected with the bench so as not to move along it longitudinally?

To this interrogatory the witness says: It was.

Question 22. Upon what was the plank or board placed as it moved through this machine, and under, and against the cutting edges of the cylinder?

To this interrogatory the witness says: On the carriage.

Question 23d. Have you ever examined the specification and drawing annexed to the first patent issued to William Woodworth, deceased, December 27th, 1828?

To this interrogatory the witness says: I don't know that I have.

Question 24th. Will you examine it.

To this interrogatory the witness says: I will, I have now slightly examined it.

Question 25th. Was the planing cylinder in this machine and in the machine as described in Woodworth's amended reissued specification, fixed to or connected with the bench so as not to move along it longitudinally?

To this interrogatory the witness says: I decline to answer, as I have not had time to compare the two.

Question 26th. Will you now compare the two?

To this interrogatory the witness says: I will, if I have time enough given me; the cylinder appears to me to be fixed to the bench.

Question 27th. Was this cylinder hung upon its axis over and at right angles to the bench in the Woodworth machine as described in these specifications and drawings?

To this interrogatory the witness says: In the drawing the axis of the cylinder is vertical; in the specifications it is described both ways in both patents. When hung horizontal, it was over and at right angles. What I mean by the bench is what the whole rests on. In both cases it is at right angles to the plank.

Question 28th. Upon what was the board placed, as it moved through the Woodworth machine, as described by him in his specifications and drawings of 1828?

To this interrogatory the witness says: Upon a carriage.

Question 29th. As the board in this machine moved on the carriage against and under the edges of the cutting cylinder, did the cutting cylinder, while in motion and operating upon the board, tend to lift it from the carriage?

To this interrogatory the witness says: It did.

Question 30th. Look at the specification and drawings annexed to Woodw[or]th's patent of 1828, and state what he there describes or represents to prevent the board from being lifted from the carriage.

To this interrogatory the witness says: In the drawings I discover pressure rollers, *f*, on both sides of the cylinder. Nothing is said about these in the specifications.

Question 31st. Does it appear by the specification or drawings how the rollers in the drawing are made pressure rollers?

To this interrogatory the witness says: It does not appear in the specification, but it appears in the drawing from their position that they are pressure rollers.

Question 32d. Why does it appear from their position?

To this interrogatory the witness says: Because they are placed both sides of the cutting cylinder and near to it.

Question 33d. Is there any other reason for this your opinion?

To this interrogatory the witness says: I do not discover any other.

Question 34th. May not the roller *f*, which is represented in the drawing as extending across the board after the same has passed under and been planed by the cylinder, be unyielding upon its axis and not a pressure roller?

To this interrogatory the witness says: That portion of the board which has passed through and is planed permits it to be unyielding during the operation of planing the board, but when a board of another thickness is put in, either that or the carriage must be adjustable.

Question 35th. Then there is nothing in the position of that roller, is there, to indicate it a pressure roller?

To this interrogatory the witness says: It is a continuous unyielding pressure roller.

Question 36th. How can it be a pressure roller, and still unyielding?

To this interrogatory the witness says: Because the axis is fixed at a given distance, which keeps it hard against the plank while being planed, that is, moderately hard.

Question 37th. Does this, in your judgment, constitute a pressure roller?

To this interrogatory the witness says: It does; one kind of pressure roller, an unyielding kind.

Question 38th. Is this kind of pressure roller substantially the same in mechanics as a yielding pressure roller?

To this interrogatory the witness says: It is not fully so.

Question 39th. Is it a mechanical equivalent for the yielding pressure roller?

To this interrogatory the witness says: It is, upon true surfaces.

Question 40th. Turn your attention to the other roller *f*, on that side of the cylinder at which the board is first presented to be planed, and state why, from the position of that roller, it must have been a yielding pressure roller.

To which interrogatory the witness says: It must have been a yielding pressure roller when the board was of an uneven surface, because of that unevenness.

Question 41st. Is there any thing in the drawing or specification to indicate that this must have been a yielding pressure roller, but the fact of its position as you have stated?

To this interrogatory the witness says: I have not discovered any.

Question 42d. Is it your opinion that a competent mechanic, if told to construct a machine from that drawing and specification, would have made that a yielding pressure roller in consequence of its position?

To this interrogatory the witness says: He would not, in following the specification and drawing.

Question 43d. You have sworn that from the position of that roller it must have been yielding; would not a competent mechanic, in constructing a machine for planing boards of unequal thickness, have made this roller yielding for that purpose, from its very position in the drawing?

To this interrogatory the witness says: He would, if he constructed it for the unequalness of the board; if the boards were true they would not require it.

Question 44th. Are rough boards, such as are usually planed, ever of an equal thickness throughout, so far as your observation enables you to judge?

To this interrogatory the witness says: They are generally not.

Question 45th. Please state then whether this roller, last referred to, would, in your judgment, by a competent mechanic, have been made yielding in consequence of its position being upon that side of the cylinder to which the board is first presented to be planed?

To this interrogatory the witness says: I think it would.

Question 46th. As the cylinder for planing is placed in the Woodworth machine, does not the distance of its knives from the carriage, when the board to be planed is placed upon it, or from the bed-plate when no carriage is used, determine the thickness to which the board is to be reduced?

To this interrogatory the witness says: It does.

Question 47th. As the cylinder for planing is placed upon Roguin's first machine, does not the distance of its knives from the carriage on which the board is placed, determine the thickness to which the board is to be reduced?

To this interrogatory the witness says: It does.

Question 48th. As the board in this machine (Roguin's first machine) moved on the carriage against and under the edges of the cut-

ting cylinder, while in motion and operating upon the board, did not this cylinder tend to lift the board from the carriage?

To this interrogatory the witness says: It would if cutting outward; if cutting inward it would not.

Question 49th. Would the board remain stationary and firm on the carriage while being planed, whichever way the knives cut?

To this interrogatory the witness says: In cutting outward it would not, unsupported; in cutting inward it possibly might tremble without being supported.

Question 50th. Don't you know that the board would tremble?

To this interrogatory the witness says: A thin board might, but a very thick one I think would not, if properly held at the ends and edges, that is, in cutting inward.

Question 51st. Is there any thing in the description of Roguin's first machine, which states whether the knives cut outward or inward?

To this interrogatory the witness says: I do not discover any.

Question 52d. What does Roguin describe in his specification and drawings of his first machine to prevent the board from being lifted from the carriage by the action of the cylinder?

To this interrogatory the witness says: The wooden cross piece, marked *x*, called the guide.

Question 53d. Was not that cross piece as described placed across the board on that side of the cylinder to which the board was to be first presented to be planed?

To this interrogatory the witness says: I am unable to say from the description and drawing which side of the cylinder it was placed. The drawing I have not by me; on examining the drawing, figures 1 and 2, the bar *x* appears to be in the rough or unplaned side of the board. According to the drawing, figures 1 and 2, the cross piece is placed across the board on that side of the cylinder on which the board is first presented to be planed.

Question 54th. You have sworn that from the position of the roller represented in the drawing of 1828, annexed to Woodworth's patent, that it must have been a yielding pressure roller to plane boards of an uneven thickness; you have sworn that the bar *x* is placed in the same relative position in which this roller is placed, must not this bar therefore from its position have been yielding?

To this interrogatory the witness says: It must, to plane unequal or untrue surfaces.

Question 55th. You have sworn that in your opinion a competent mechanic would have made this roller in the Woodworth machine yielding for planing unequal surfaces from the very position it there occupies; you have sworn that the bar *x* occupies the same relative position in Roguin's first machine, would not therefore any competent mechanic in constructing Roguin's first machine, in your judgment, have made this bar yielding from its position in Roguin's drawing?

To this interrogatory the witness says: He would for planing uneven surfaces.

Question 56th. Upon what does the board or plank rest as it is moved through the Woodworth machine when no carriage is used upon friction rollers and a bed underneath the cutting cylinder?

(No answer recorded.—Clerk.)

Question 57th. Upon what bench or structure are these rollers and bed confined or placed?

To this interrogatory the witness says: In the drawing the friction rollers lie horizontal, and the bed and plank are vertical; these are placed on a bench or frame.

Question 58th. What would be the effect upon the board placed in the Woodworth machine, of removing the pressure rollers placed across the board, and setting the planing cylinder in operation upon the board?

To this interrogatory the witness says: It would tend to lift the board from the bed.

Question 59th. Towards what?

To this interrogatory the witness says: Towards the cutting cylinder?

Question 60th. For what purpose then are these pressure rollers applied in the Woodworth machine now generally used?

To this interrogatory the witness says: To prevent the plank being lifted towards the cutting cylinder.

Question 61st. If you were to remove the pressure rollers from the Woodworth machine, and place a planing cylinder with its axis underneath the bed plate in such a manner that the knives upon the cylinder should appear slightly above the bed plate, and should place a board upon that bed plate and set the cylinder in operation, what would be its effect upon the board as its edges came in contact therewith?

To this interrogatory the witness says: Without any further support it would be drawn towards the cutting cylinder.

Question 62d. Would the bed plate or bench on which the board rests in such case prevent the board from being drawn into the cylinder?

To this interrogatory the witness says: It would of course, the bed plate would prevent it being drawn into the cylinder.

Question 63d. You have sworn that the purpose of the pressure rollers in the Woodworth machine is to prevent the plank from being lifted towards the cutting cylinder; you have sworn that when the cylinder is placed with its axis underneath the bed plate, the bed plate prevents the board from being so drawn into the cylinder; does not the bed plate in the latter case accomplish the same purpose that the pressure rollers do when the axis of the cylinder is hung over the bed plate as in Woodworth's machine?

To this interrogatory the witness says: It does.

Question 64th. When the cylinder is hung over the bed plate its combination therewith and distance therefrom determines the thickness to which the board is to be reduced, do they not?

To this interrogatory the witness says: They do.

Question 65th. When the cylinder is hung with its axis underneath

the bed plate, does such combination alone enable you to gauge or determine the thickness to which you wish to reduce the board?

To this interrogatory the witness says: The bed in this case being the place on which the board rests, it does not.

Question 66th. You have sworn that when the axis of the cylinder is hung over the bed plate as in Woodworth's machine, you are thus enabled to determine the thickness of the board to be planed, but that the cylinders without pressure rollers will draw the board into the knives; you have also sworn that when the cylinder is hung with its axis underneath the bed plate, that the bed plate prevents the board from being drawn into the knife, but that such combination does not enable you to gauge or determine the thickness of the board; are these combinations then the same, or substantially different when considered alone?

To this interrogatory the witness says: This bed you speak of, the board lays on in both cases, as well where the cutting cylinder is above as below; I consider these combinations substantially the same.

Question 67th. Do they produce, when considered alone, substantially the same results?

To this interrogatory the witness says: In the Woodworth machine, as there stated, it gauges to a thickness; in the other, as I understand it, it does not. Here is where the confusion arises, from this bed, upon which the board rests in the machine, where the cutting cylinder is underneath the board. If the bed is opposite the cutting cylinder as in Woodworth's machine, the result is the same.

Question 68th. Is a combination of machinery which gauge the thickness of a board, the same in its result as a combination which does not?

To this interrogatory the witness says: It does not produce the same result.

Question 69th. Is a combination of machinery which results in lifting the board into the cutting cylinder, the same as that which prevents it from being so lifted?

To this interrogatory the witness says: It is not.

Question 70th. Is a combination of machinery which gauges the thickness of a board to be planed, the same as that which does not so gauge it?

To this interrogatory the witness says: It is not.

The examination was here adjourned until 10 o'clock of the 15th instant.

March 15th. The examination of the same witness was continued.

Question 71st. What is the invention of William Woodworth for planing boards and plank, as claimed by him in his specification of 1845?

To this interrogatory the witness says: According to the claim I find, "what is claimed therein as the invention of William Woodworth, deceased, is, the employment of rotating planes, substantially such as

herein described, in combination with rollers or any analogous device, to prevent the boards from being drawn up by the planes in cutting upward, or from the reduced or planed to the unplaned surface as described.

Question 72nd. You have sworn that you understand the principle involved in the Woodworth machine, state what this principle is.

To this interrogatory the witness says: It is the rotary cutters and the pressure rollers, as I understand.

Question 73rd. Would this principle in your opinion be changed if, instead of the pressure rollers, pressure bars should be introduced into the machine?

To this interrogatory the witness says: I think it would not if these bars were adjustable.

Question 74th. If these bars were yielding, would they not be adjustable?

To this interrogatory the witness says: I should think they would.

Question 75th. You have sworn that a competent mechanic in constructing a machine like that first described by Roguin, would from the position which the bar x occupies in his drawing, make it yielding to plane unequal surfaces. You have sworn that a yielding bar introduced in the place of pressure rollers would not change the principle of the Woodworth machine. You have also sworn that the principle of that machine is the rotary cutters and pressure rollers; what, then, is the principle of the machine first described by Roguin?

To this interrogatory the witness says: The principle of the Roguin machine, as described, is a planing machine with an unyielding bar. I do not discover any evidence in the specification and drawing that Roguin was competent to construct a machine with a yielding pressure bar, when used for thin materials, thin boards for instance. This bar spoken of accommodates a true surface on the rough part of the plank only, I mean an unplaned surface, being true.

Question 76th. If the Roguin machine were constructed as you have sworn, a competent mechanic would from the position of the bar x have constructed it for planing unequal surfaces with a yielding pressure bar; what in such case would be the principle of this machine?

To this interrogatory the witness says: As I understand the question, it would have been a planing machine with a yielding pressure bar.

The witness here refers to a dictionary.

I did not fully understand the question; my error arose from separating the word principle from combination; this was my object in referring to the dictionary.

The principle would be a rotating cylinder, with an adjustable bar x.

Question 77th. You have sworn that it would not change the principle of the Woodworth machine if, instead of the pressure roller, the yielding bar were substituted; would not then the principle of the Roguin machine, constructed with the yielding bar, be the same as the principle of the Woodworth machine?

To this interrogatory the witness says: I think it would.

Question 78th. What is the principle of the Woodworth machine for tongueing and grooving?

To this interrogatory the witness says: The principle is rotating cutters, one on each edge of the plank, one to cut the groove and the other to cut the tongue. It is this combination that makes the tongue and groove.

Question 79th. If two saws to cut the groove and four saws to cut the tongue were combined for the purpose of tongueing and grooving, would this combination of saws be different in principle from the combination of Woodworth cutters for that purpose?

To this interrogatory the witness says: It would.

Question 80th. Why?

To this interrogatory the witness says: Because one scrapes and the other shaves; the saw scrapes, and the cutters of Woodworth shave.

Question 81st. Do you pronounce this a difference in principle, because saws are in your opinion substantially different from cutters?

To this interrogatory the witness says: That is one reason; another is, there is a greater number of pieces in the combination than there is in the Woodworth machine.

Question 82nd. Would a person who used a combination of saws with pressure rollers instead of cutters, therewith to tongue and groove boards and plank, in your opinion, thereby use any part of Woodworth's invention?

To this interrogatory the witness says: As I understand the question, they would use the pressure roller of Woodworth only; I consider that a part of Woodworth's combination.

He adds, I did not understand the question. The question being repeated:

I think he would not.

Question 83rd. You have sworn that the bed plate, when a planing cylinder is hung underneath it, prevents the board from being drawn into the knives; but you state that in such case no means would exist to gauge the thickness of the board to be planed; what means does Norcross adopt for the purpose of gauging this thickness?

To this interrogatory the witness says: He has the bed or rest marked *f* in figure 6. I find the letter *f* on figures 3, 4, 6, 7, and 9.

Question 84th. Does the distance of this rest from the knives of the planing cylinder determine the thickness of the board to be planed?

To this interrogatory the witness says: The distance does.

Question 85th. Do this rest and the cylinder, as they move up and down to accommodate the different thickness of boards, maintain their relative distance from each other while the machine is in operation.

To this interrogatory the witness says: The cutter wheel and the rest *f* does.

Question 86th. Is there any frame in the Woodworth machine in which the planing cylinder moves up and down to accommodate different thicknesses of boards?

To this interrogatory the witness says: I do not see there is.

Question 87th. Does the cylinder in the Woodworth machine move up and down, or is it fixed while in operation?

To this interrogatory the witness says: The axis of the cylinder is fixed.

The cross examination here closed.

Rejoinder. The direct examination resumed.

Question 1st. In answer to an interrogatory in chief, you used the word "rendering;" please state in what sense you used that word.

To this interrogatory the witness says: I used it as meaning "yielding."

Question 2nd. In answer to the 4th cross interrogatory, you have stated that in Manneville's machine for tongueing and grooving the board is held down by a roller; will you state whether or not this is the only means of holding down the plank, and if not, what other means are described or represented?

To this interrogatory the witness says: It is not the only means; it may be held by a bar.

Question 3d. Will you examine the specification and drawings of Manneville's tongueing and grooving machine, with a view to ascertain what other means are described or represented for holding down the board, and state those means.

To this interrogatory the witness says: I will. I do not discover any other means in the tongueing and grooving machine; it simply says it is secured, but does not say how, except so far as the pressure roller secures it.

Question 4th. In the addition to Manneville's patent, does he or not describe the mode of clamping the ends of the plank to the parts of a chain or endless carriage?

To this interrogatory the witness says: He does.

Question 5th. Does he or not state that the roller must be grooved to pass over the heads of the bolts that secure the clamps?

To this interrogatory the witness says: He does.

Question 6th. If that mode of holding down the plank were applied to planing, how would the cutting irons or planes avoid these bolts?

To this interrogatory the witness says: Only by the heads of the bolts being below the cutting surface of the board.

Question 7th. Do you find any provision in the description for placing them below the surface of the board?

To this interrogatory the witness says: None.

Question 8th. If the ends of the board were not clamped to a carriage and only one pressure roller or bar applied on one side of the planing cylinder, would it be practicable to plane thin planks to a smooth surface?

To this interrogatory the witness says: I think not.

Question 9th. In Manneville's machine for planing, is the motion of one of the two carriers towards and from the board, for the purpose of

adjusting the instrument to plane different thicknesses of plank, or is it a motion towards and from in the act of cutting?

To this interrogatory the witness says: I think it is to adjust the thickness of the boards to be planed.

Question 10th. Taking the whole of that part of Manneville's description applied to planing, as well the motion of the tool carried up and down, as the position of the rollers, are or not the feeding rollers applied to the edge of the plank?

To this interrogatory the witness says: I should think they were from the first part of the specification relating to that part, but in another part he says that he places them against the sides.

Question 11th. Could or not a competent machinist from Manneville's description of the planing machine, construct a practical planing machine without invention?

To this interrogatory the witness says: I think he could not if he relied wholly on the specification.

Question 12th. In answer to the 35th and 36th cross interrogatories, you draw the distinction between a yielding and non-yielding pressure roller; can you give an example of a non-yielding pressure roller in any branch of the arts? And if so, state it.

To this interrogatory the witness says: I can. There are the rolling mills for rolling metals and other things.

Question 13th. A machine having been devised for planing with a planing cylinder and non-yielding roller or bar as applied to the planing of planks of equal thickness, would it or not require invention to adapt that machine to the planing of plank of unequal thickness and reduce them to equal thickness, in view of the state of the arts at the time of Roguin's invention?

To this interrogatory the witness says: I think it would.

Question 14th. In view of the attachment of the bars to the carriage of the planing cylinder in Roguin's second invention, do you or not think that he contemplated the application of his machine to the planing of planks that were of unequal thickness before being placed in the machine?

To this interrogatory the witness says: I do not think he did.

Question 15th. Could or not an instrument constructed like that described and represented in Roguin's first patent for reducing the surface of plank, produce the operation of planing by a shaving action?

To this interrogatory the witness says: It would.

Question 16th. Have you examined the drawings with that view?

To this interrogatory the witness says: I have heretofore.

Question 17th. Did you in your answer to the 15th interrogatory refer to the description and drawing of the patent of 1817 or 1818?

To this interrogatory the witness says: To that of 1817.

Question 18th. Do you draw any distinction between a cutter for scraping and one for shaving?

To this interrogatory the witness says: I do.

Question 87th. Does the cylinder in the Woodworth machine move up and down, or is it fixed while in operation?

To this interrogatory the witness says: The axis of the cylinder is fixed.

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Question 10th. Taking the whole of that part of Manneville's description applied to planing, as well the motion of the tool carried up and down, as the position of the rollers, are or not the feeding rollers applied to the edge of the plank?

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To this interrogatory the witness says: I can. There are the rolling mills for rolling metals and other things.

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To this interrogatory the witness says: I think it would.

Question 14th. In view of the attachment of the bars to the carriage of the planing cylinder in Roguin's second invention, do you or not think that he contemplated the application of his machine to the planing of planks that were of unequal thickness before being placed in the machine?

To this interrogatory the witness says: I do not think he did.

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To this interrogatory the witness says: I have heretofore.

Question 17th. Did you in your answer to the 15th interrogatory refer to the description and drawing of the patent of 1817 or 1818?

To this interrogatory the witness says: To that of 1817.

Question 18th. Do you draw any distinction between a cutter for scraping and one for shaving?

To this interrogatory the witness says: I do.

Question 19th. Is the form of the cutters in the patent of 1817 such as will scrape or shave?

To this interrogatory the witness says: The specification is indistinct as to the position of the edge of these knives as far as I can see, except that they are placed oblique to the axis of the cylinder. If they are placed tangential to the periphery, they shave; if they are placed in the radii of the cylinder, they scrape.

Question 20th. Have you seen the drawings of Roguin's patent to-day, or do you speak from recollection?

To this interrogatory the witness says: I have not seen them to-day; I speak from recollection so far as the drawings are concerned.

Upon a closer examination of the specification it would appear that the edges of the cutters are in the radii of the cylinder.

Question 21st. When in your cross examination you testified that if Roguin's machine of 1817 were constructed with a yielding bar it would present the same combination as the Woodworth machine; did you consider the difference, if any, in the construction of the planing cylinder?

To this interrogatory the witness says: I supposed they were alike.

Question 22d. Having had your attention called to the construction of the cylinder in Roguin's patent of 1817, if constructed with a yielding bar, would the machine be a good practical machine for planing?

To this interrogatory the witness says: It would not, if the cutters were in the radii of the cylinder.

Question 23d. Is or not the combination in the Norcross machine, of the planing cylinder, the rest *f*, and the bars B, called in the specification platform, substantially the same as the combination of the planing cylinder, the bed and pressure rollers, of the Woodworth machine?

To this interrogatory the witness says: I deem that they are equivalents.

Question 24th. Is or not this combination in both essential to the planing of planks and reducing them from an unequal to an equal thickness?

To this interrogatory the witness says: I think it is.

Question 25th. In view of a machine for tongueing and grooving, with two circular saws to cut out the groove, and two to form the tongue, combined with the pressure roller, would or not the combination of two cutter wheels, one for the tongue and one for the groove, with a pressure roller, be the invention of an improvement?

To this interrogatory the witness says: It would.

Direct examination here closed.

Cross examination resumed.

Question 1st. You state in your direct examination that upon a closer examination of the specification of Roguin's first invention, it would appear that the edges of the cutters are in the radii of the cylin-

der; read all that part of the specification which leads you to form this opinion.

To this interrogatory the witness says: The blades with which these cylinders are furnished are made out of the thickness of the iron; they are cut obliquely. That is all that leads me to form this opinion.

Cross examination here closed.

Direct examination resumed.

Question 1st. Has any thing occurred to you since the conclusion of your examination in chief which induces you to modify or change the opinion you have therein expressed?

To this interrogatory the witness says: To answer this question I wish to examine my testimony in chief.

March 19th. I have now examined my testimony, and I think not.

JOHN H. TIMS.

ROBERT B. CAMPBELL,
Notary public.

UNITED STATES OF AMERICA,
State of New York, ss.

By this public instrument be it known, to all whom the same doth or may in any wise concern, that I, Robert B. Campbell, a public notary in and for the State of New York, by letters patent under the great seal of the said State, duly commissioned and sworn, dwelling in the city of New York, do hereby certify, that on the seventeenth, eighteenth, nineteenth, twentieth, and twenty-first days of March, 1851, the annexed testimony was by me taken and reduced to writing in the presence of the counsel and the witness, and was afterwards copied and by me compared, read over by the witness, and by him signed in my presence; and I further certify, that the counsel of the respective parties agreed that all objections to the relevancy or competency of the questions put by either party, and the answers given by the witness, should be taken at the hearing of the same, the same as if now noted.

In testimony whereof I have subscribed my name and caused my notarial seal of office to be hereunto affixed, the twenty-second day of March, in the year of our Lord one thousand eight hundred and fifty-one.

Witness' attendance, 5 days.

ROBERT B. CAMPBELL,
Notary public.

CIRCUIT COURT OF THE UNITED STATES,
District of Massachusetts.

BROOKS AND ANOTHER
vs.
FISKE AND ANOTHER.

CITY AND COUNTY OF NEW YORK,
State of New York, ss.

On the 17th day of March, in the year 1851, before me, Robert B.

Campbell, a public notary of the State of New York, by letters patent under the great seal of the said State, duly commissioned and sworn, and residing in the city of New York, came the plaintiffs in the above entitled suit, by Charles L. Woodbury, esq., of counsel, who requested to have taken the deposition of Thomas J. Sloan, a witness in the above entitled cause, produced by the plaintiffs; and the defendants in said cause appearing by E. W. Stoughton, esq., of the city of New York, their counsel, the said witness was by me duly sworn and examined on the following interrogatories to him propounded, and made answers which are written after the several interrogatories.

Question 1. What is your age, name, and residence?

To this interrogatory the witness says: My name is Thomas J. Sloan; my age is 32; I reside at 343, 4th avenue, New York city.

Question 2. What is your profession, and how long have you followed it; have you devoted any attention to mechanical science, and are you expert in comparing machines in regard to the novelty of the principles embodied in them?

To this interrogatory the witness says: I am a machinist; I have followed this profession about fourteen years; I have devoted much attention to mechanical science, and I think I am expert in comparing machines in regard to the novelty of the principles embodied in them.

Question 3. Have you examined a certified copy of the re-issued letters patent, granted to William W. Woodworth on the 8th of July, 1845, and do you think that you understand the same?

To this interrogatory the witness says: I have examined them, and think that I understand them.

Question 4. Have you examined the letters patent granted to Nicholas G. Norcross on 12th of February, 1850, and do you think that you understand the machine therein described?

To this interrogatory the witness says: I have examined them, and I think I o.

Question 5. Have you ever seen the Woodworth machine in operation and observed its mode of operating?

To this interrogatory the witness says: I have.

Question 6. What are the offices and use of the pressure rollers of Woodworth's machine, and what is the office and use of the bed plate?

To this interrogatory the witness says: The office of the pressure rollers is to press the plank to be planed against the bed or rest, and to prevent it rising or going towards the cutters. The bed or rest is to keep the plank a certain distance from the cutters, and thereby determine the thickness of the plank.

Question 7. What use or benefit in planing is effected by preventing the board or plank being drawn towards the axis of the cutters?

To this interrogatory the witness says: If it were not for the rollers, or some analogous device, the board would be raised up and torn to pieces by the cutters.

Question 8. Are there equivalent modes of producing the same

effect in the Woodworth machine as the rollers? If so, please state some of the modes which, in your opinion, are equivalent to said pressure rollers.

To this interrogatory the witness says: There are equivalent modes. I should say any thing that so bears upon the board so as to press the side not to be planed against a bed or rest is equivalent.

Question 9. Are the pressure rollers in Woodworth's machine adjustable or not? If yea, for what purpose are they adjustable, and how?

To this interrogatory the witness says: They are adjustable. They are that they may accommodate themselves to the varying thickness of a board. The journal boxes of these pressure rollers move up and down in ways, and are acted upon by springs or weights.

Question 10. Whether or not does the machine described by Nicholas G. Norcross contain, and what arrangement or provision as a substitute for the bed plate and adjustable pressure rollers of Woodworth's machine?

To this interrogatory the witness says: As I see Mr. Norcross's machine, it seems to be one and the same thing as the Woodworth machine, with the exception that it is turned upside down. The cross pieces marked B and B^1 are used for the same purpose as the pressure rollers, and act as mechanical equivalents for the same. This machine, as I see it, will be the same as the Woodworth machine with the pressure rollers fastened, independent of the machine, and a heavy spring to lift or press the bed upwards.

Question 11. Will the Norcross machine perform the same operations as the Woodworth machine does?

To this interrogatory the witness says: I should say it would.

Question 12. Whether or not, in each machine, are the devices for feeding a board of unequal thickness to the cutters self-adjusting?

To this interrogatory the witness says: I should say they were.

Question 13. Please specify or describe how these devices are arranged in the Norcross machine for feeding boards of unequal thickness, and for reducing them to an equal thickness?

To this interrogatory the witness says: The feed rollers, G and F, feed the board across or over the cross piece or rest B, passing under the rest *f*, which rises to accommodate itself to the thickness of the board, where it comes in contact with the cutter, being a fixed distance from the cross piece or rest *f*; by this device the board is reduced to an equal thickness, and the board in its outward passage rests on the cross piece B^1.

Question 14. Whether or not in the Norcross machine does the rest bar *f* perform the same duty as the bed plate in the Woodworth machine? If not, what is the distinction?

To this interrogatory the witness says: It performs the same duty, with the exception that it does not hold the weight of the plank.

Question 15. Whether or not, in each machine, is the board planed and reduced to an equal thickness by the same operation?

To this interrogatory the witness says: They appear to me to be the same, with the exception that the cutter in one case is under the rest, and in the other is over it.

Question 16. Whether or not, in each machine, does the cutter plane the plank and reduce it to an equal thickness by the same operation?

To this interrogatory the witness says: In each it does.

Question 17. What new and useful principle in planing and reducing boards to an equal thickness is introduced by the Norcross machine into the business of planing, which does not exist in the Woodworth machine?

To this interrogatory the witness says: Not any.

Question 18. Have you seen and examined a certified copy, from the Patent office at Washington, of an article in the Brevet d'Invention, vol. 23, pages 207 to 211 inclusive, and the drawings thereto attached and numbered; and has your examination thereof been made through the medium of a translation, or otherwise; and do you understand the description and drawings?

To this interrogatory the witness says: I have examined such certified copy through the medium of a translation. I think I do understand that description and drawings.

Question 19. Whether or not in the Roguin first machine for planing boards do you find a rotary cutter?

To this interrogatory the witness says: I find a rotary burr cutter.

Question 20. Please explain what is a burr cutter, and how it differs from a planing cutter.

To this interrogatory the witness says: A burr cutter is a wheel or cylinder with teeth cut on around it. I do not know how to explain it any clearer. The burr cutter or wheel scrapes, while on the other hand the other cuts or shaves; cuts, not scrapes. What I mean by scraping in the burr cutter is, that process which tears the grain from the part being planed or cut, while on the other hand the cutter cuts the shaving from the board. The burr cutter, by scraping, produces a rough surface; the cutter cuts the shaving from the board, leaving a smooth surface.

Question 21. To what causes is this owing that these tools exert a different effect on the material?

To this interrogatory the witness says: The angle of the tooth or cutter of the burr wheel has of necessity a more obtuse angle than the knife in the cutters; therefore, when the teeth strike the board or substance to be cut, they strike the end of the grain, thereby curling and shoving it off; whereas in the knife or cutter the edge passes under the grain, thereby lifting it, and leaves the surface cut smooth.

Question 22. How are the knives placed on a planing cutter, as distinct from a burr cutter?

To this interrogatory the witness says: The knives of the cutting cylinder are placed on the periphery of the cylinder; in the burr cutter they are solid. On the burr cutter the cutting edge stands in a line

from the centre, while the cutters as placed on the planing cylinder stand at right angles, or nearly so, to the centre of the cylinder. I said that the cutters fastened on the cylinder stand at right angles, or nearly so, from the centre of the cylinder.

Question 23. Please make a sketch of the two on your deposition. [*See Exhibit annexed.*]

Question 24. Are burr cutters and planing cylinders both used in mechanics at present, and are their distinctions well known to mechanics?

To this interrogatory the witness says: They are.

Question 25. In Roguin's first machine, whether or not is the burr cutter so secured in the frame as to have any movement except on its axis?

To this interrogatory the witness says: I should say not.

Question 26. How was the board fed to the cutter, and by what provision was the machine adapted to operate on boards of different thicknesses?

To this interrogatory the witness says: As I see it here, the burr cutter moves to the board. This burr cutter is secured to a carriage. This is not correct.

March 18th. The examination of the same witness was continued.

The last question being repeated, the witness says:

The board is fed to the cutter by the table or bed B, which runs on rollers between ways or cheeks. The provision as I see it in this machine is the set screws placed vertically in the carriage B, which raises and falls on adjustable bed on the same.

Question 27. What device exists for preventing the board from being drawn up towards the axis of the burr cutter by its action?

To this interrogatory the witness says: The cross piece x, fastened on frame a.

Question 28. Do the specifications or drawings indicate this cross piece x to be fixed or adjustable?

To this interrogatory the witness says: To be fixed.

Question 29. Weather or not is this machine thus described capable of reducing to an equal thickness a plank or board of an unequal thickness?

To this interrogatory the witness says: I should say not.

Question 30. Whether or not does this machine perform the same operation on the plank that Woodworth's machine does?

To this interrogatory the witness says: I should think not.

Question 31. Whether is this first machine of Roguin a practical and useful machine for planing and reducing to an equal thickness boards of an unequal thickness?

To this interrogatory the witness says: I should say not.

Question 32. Turn to the second machine of Roguin as described in the specification and drawings, and say whether or not any carriage is used in said machine to carry the board past the cutters?

To this interrogatory the witness says: Not any.

Question 33. What instrument does he use to smooth or reduce the board in this machine?

To this interrogatory the witness says: He uses cutters.

Question 34. Are these planing cutters, or burr cutters?

To this interrogatory the witness says: Planing cutters.

Question 35. Whether or not are the journals of the cutting cylinder fixed to the frame of the machine, or how otherwise?

To this interrogatory the witness says: They are fixed to the frame *f*.

Question 36. Is that frame stationary, or has it a movement, and what movement?

To this interrogatory the witness says: It is not stationary; it moves up and down to accommodate itself to the varying thickness or inequality in thickness of a plank.

Question 37. Has the frame *f* any other movement?

To this interrogatory the witness says: It moves lengthwise of the frame or bed of the machine.

Question 38. How is the plank secured on the bed or frame of the machine, when presented for the action of the cutters?

To this interrogatory the witness says: By a device commonly called "Dogs."

Question 39. What devices are attached to the cutter frame to prevent the plank being lifted by the action of the cutters towards their axis?

To this interrogatory the witness says: The frame *f*.

Question 40. Whether or not do the cutters retain a fixed distance from the bed or rest against which one side of the plank is held, while the other is being planed?

To this interrogatory the witness says: They do not.

Question 41. Whether or not does the frame *f* retain a fixed distance from the bed or rest against which one side of the plank is held, while the other is being planed?

To this interrogatory the witness says: It does not.

Question 42. Whether or not the arrangements described in the specifications and drawings of the second machine of Roguin are capable of planing and reducing to an equal thickness a plank by one and the same operation?

To this interrogatory the witness says: They are not.

Question 43. Whether or not can this machine perform the same operations on the plank as Woodworth's machine does?

To this interrogatory the witness says: I should say not.

Question 44. Turn to Manneville's patent, and say have you examined this specification and drawings through the means of a translation and a certified copy, or otherwise?

To this interrogatory the witness says: I have examined it through the medium of a translation.

Question 45. Whether or not are any drawings shown you of the planing machine?

To this interrogatory the witness says: I have not seen any.

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Question 46. Have you examined the specification of the planing machine of Manneville, and could you, as a machinist, construct a planing machine from the description there given?

To this interrogatory the witness says: I could not.

Question 47. Can you, as a constructor, guided by that description, construct the planing instrument there indicated?

To this interrogatory the witness says: I could not.

Question 48. Does the description so indicate the location and mode of working the planing instrument as to enable you to place it as contemplated by Manneville.

To this interrogatory the witness says: It does not.

Question 49. Is there such description of any means of reducing a plank to equal thickness as would enable you to build a machine so to do?

To this interrogatory the witness says: Not any that I can discover.

Question 50. What device does he describe to prevent the plank from being lifted towards the axis of the plane by the cutting process?

To this interrogatory the witness says: Not any that I can discover.

Question 51. Is the motion of one of the tool carriers described as being from and towards the board, and is it for the purpose of adjusting the instrument to plane different thicknesses of plank, or is it a motion towards and from in the action of cutting?

To this interrogatory the witness says: I should think that it was for the purpose of setting the plane or cutter to match the other one spoken of.

Question 52. Do you discover in the Manneville description anything as a constructor to enable you to build the Woodworth machine, or any machine that could produce the same effect upon a plank as the Woodworth machine?

To this interrogatory the witness says: I do not.

The direct examination here closed.

Being cross examined by the counsel for the defendant.

Question 1. In what particular business are you now engaged in the city of New York, or elsewhere?

To this interrogatory the witness says: In planning and building screw machinery.

Question 2. At whose manufactory?

To this interrogatory the witness says: My own.

Question 3. Where?

To this interrogatory the witness says: At the Empire Iron Works, foot of east 25th street, New York.

Question 4. Upon what is the board to be planed placed in Roguin's second machine?

To this interrogatory the witness says: On a bed.

Question 5. Is this bed moveable vertically, or fixed?

To this interrogatory the witness says: It is moveable vertically.

Question 6. For what purpose?

To this interrogatory the witness says: To set it to and from the cutters for planing various thicknesses of stuff.

Question 7. When fixed vertically for a particular thickness, did it remain so fixed as the cylinder passed over the board in the process of planing it?

To this interrogatory the witness says: I think it does.

Question 8. In what was the cylinder fixed as it passed over the board?

To this interrogatory the witness says: In the frame *f*, called a carriage.

Question 9. Upon what did this carriage move as it carried the cylinder?

To this interrogatory the witness says: It moves along back and forth on the frame *c* and c^1.

Question 10. By what device was it connected with and made to move along this frame?

To this interrogatory the witness says: It has bearing pieces on each side which rub against the side of the frame, while a projection on the same rubs on the top of the same frame.

Question 11. Does it not move along the frame by means of cog-wheels?

To this interrogatory the witness says: It does by rack and pinion.

Question 12. Does not the specification of Roguin's second machine state that the carriage which carries the planing cylinder must be so heavy as not to be lifted by the action of the tool against the wood?

To this interrogatory the witness says: I think it does.

Question 13. You have sworn that the board to be planed is placed upon a bed under the planing cylinder; and you have also sworn that this bed, when fixed vertically for any particular thickness, remains so fixed as the cylinder passed over the board in the process of planing it. You have also sworn that the frame which carries the cylinder must be so heavy as not to be lifted by the action of the tool against the wood; tell me, then, why Roguin's second machine would not plane a board of unequal to an equal thickness throughout?

In Roguin's first machine there is a cross piece *x*, which appears to me to be fixed. We will suppose a plank or joist to be planed six feet long. We will suppose the carriage *f*, which holds the cutter in Roguin's second machine, two feet wide, taking for the width the narrowest part of the frame, or that part which sets at right angles, with the centres of the revolving cutter.

Question repeated.

The board, three or four feet from the end, may have a rise on the surface to be planed one inch high, six inches long, the rest part is parallel with the first mentioned surface; now as the carriage *f* moves along the surface, the front part of the carriage strikes the rise first, which raises that side just spoken of, and consequently raises the cutting cylinder attached to the carriage *f*, whereby it leaves a corresponding rise, but not to so great a degree, on the board.

Question 14. Suppose the front part of the carriage you speak of to be high enough above the surface of the board not to touch this inequality, would the board, in such case, be reduced to an equal thickness?

To this interrogatory the witness says: I think it would, provided it, the board, should be kept down to the bed.

Question 15. Suppose, instead of moving the cylinder over the board in Roguin's second machine, he had moved a carriage with the board upon it under the cylinder, the axis of which is fixed vertically, would the board, by this process, be reduced from an unequal to an equal thickness?

To this interrogatory the witness says: I should think it would not, as the pressure bar or frame before mentioned will still perform the same functions relative to the cutters and board.

Question 16. Instead of moving this carriage with the board upon it under the cylinder, suppose you move the cylinder with its axis fixed vertically over the board, would not the board, by this process, be reduced from an unequal to an equal thickness?

To this interrogatory the witness says: In this question I suppose the cutting cylinder to be fastened to a frame or carriage as in the last question; if so, the result would be the same as there mentioned.

Question. 17. Does not Roguin say, in the specification of his second machine, that the planing cylinder has two movements, one rotary, the other progressive; and does he not also say that the carriage on which the cylinder is carried must be so heavy as not to be lifted by the action of the planing cylinder?

To this interrogatory the witness says: He does.

Question 18. From this description, then, does it not appear that the axis of the cylinder in Roguin's second machine was fixed vertically?

To this interrogatory the witness says: I don't see it so.

Question 19. How do you see it from the description referred to?

To this interrogatory the witness says: The cutter is over the top of the plank, and the frame on which the cutters are fixed are also above the plank, I should infer from the description.

Question 20. Does the axis of the cylinder, as it moves over the board in Roguin's second machine, move as he describes it upon a plane?

To this interrogatory the witness says: When not lifted up by the irregularities of the plank it does.

Question 21. Refer to and read any portion of the specification of Roguin's second machine, which states that the planing cylinder therein is lifted up by the irregularities of the plank as the cylinder moves over it.

To this interrogatory the witness says: I have read the specification, and do not see any language expressing the same.

Question 22. From the language, then, of the specification, does it not appear that the planing cylinder moves over the board upon a plane?

To this interrogatory the witness says: I am not aware that the specification states precisely how it does move over the board.

Question 23. Does not the specification state that the cylinder has two motions, one rotary, the other progressive?

To this interrogatory the witness says: I think it does.

Question 24. Does it not state that the frame is to be so heavy as not to permit the cylinder to be lifted up by the action of the tool?

To this interrogatory the witness says: I think it does.

Question 25. If the cylinder moved up and down in its passage over the board it would have three motions, would it not?

To this interrogatory the witness says: It would.

Question 26. For what purpose did you ever see a burr cutter used; state every purpose to which you have ever seen a burr cutter applied.

To this interrogatory the witness says: I have used them on wood, hard and soft, on steel, iron, brass, lead, silver, and stone.

Question 27 For what purpose did you ever use them on wood?

To this interrogatory the witness says: For trying what effect they would have on it.

Question 28. When did you first use them on wood?

To this interrogatory the witness says: I have used them at different times, as far back as eight years, I suppose.

Question 29. Did you continue their use for any length of time?

To this interrogatory the witness says: I did not.

Question 30. Why did you wish to ascertain what effect burr cutters would have on wood?

To this interrogatory the witness says: For the sake of knowing.

Question 31. How often, and for what length of time, did you ever use them on wood?

To this interrogatory the witness says: I can't say how often, nor how long, but sufficiently long to find out what they would produce.

Question 32. Did you make the experiment with a view to use them permanently for wood?

To this interrogatory the witness says: I did not.

Question 33. Did you ever use them on wood altogether for the period of one day?

To this interrogatory the witness says: Not half an hour.

Question 34. Why did you not use them longer?

To this interrogatory the witness says: From the simple fact that I learned all I wanted to know in one or two minutes.

Question 35. What was that?

To this interrogatory the witness says: The result that they brought about.

Question 36. What result did they bring about?

To this interrogatory the witness says: I found that the tooth struck endwise against the grain, curled or crumped up the chip, and left a rough surface behind.

Question 37. What was the size of the wheel you used, and how was it constructed?

To this interrogatory the witness says: About three inches in diameter, made out of a piece of round steel, with a hole through it, and the teeth cut on the top or periphery of the same.

Question 38. At whose request did you try this experiment?

To this interrogatory the witness says: Nobody's.

Question 39. Were you convinced by it that a burr cutter was worthless for planing?

To this interrogatory the witness says: Decidely so, for any practical purpose.

Question 40. Have you ever seen any other burr cutter used for wood besides this you have mentioned?

To this interrogatory the witness says: I think I have.

Question 41. Where, and when, and who used it?

To this interrogatory the witness says: At the Old Sterling Works, New York, some ten years ago, by a man by the name of Jackson, a companion in experiments.

Question 42. What sized wheel did he use, and for what length of time?

To this interrogatory the witness says: About the same size as I did, and for about four or five minutes, I suppose.

Question 43. Were you both satisfied from these experiments that the burr cutter was useless for planing wood?

To this interrogatory the witness says: I never asked him, from the simple fact that I thought he had sense enough to see it for himself—to see that it would not answer, as I did.

The examination was here adjourned to the 19th instant, at 10 o'clock.

March 19, 1851. The examination of the same witness was continued.

Question 44. What instrument in mechanics is a cylindrical plane? Describe it.

To this interrogatory the witness says: A cylindrical plane is a cylinder with cutters fastened on to it.

Question 45. For what purpose is it used in mechanics, when applied to wood?

To this interrogatory the witness says: For reducing and smoothing.

Question 46. For what purpose could a burr cutter be used when applied to wood?

To this interrogatory the witness says: For reducing and imperfectly smoothing.

Question 47. What instrument in mechanics is a knife or blade?

To this interrogatory the witness says: An instrument commonly known as a knife is that which has a cutting edge, with a back so constructed *so* as to allow the chip or chips to freely pass from it.

Question 48. Question repeated. What is a blade?

To this interrogatory the witness says: I refer to my former answer.

Question 49. Is a blade in mechanics the same instrument as a knife?

To this interrogatory the witness says: In the general sense it is.

Question 50. For what purpose is a blade or knife usually applied to wood?

To this interrogatory the witness says: Usually to reduce it, or to make it in particular form.

Question 51. If you, as a mechanic, were told to arm a cylinder with knives or blades for the purpose of planing boards, would you, in so constructing the planing cylinder for that purpose, make a burr or a cutting cylinder?

To this interrogatory the witness says: With my present knowledge of mechanics, I would make a cylinder with cutters.

Question 52. Is a knife a cutter?

To this interrogatory the witness says: I should think it was.

Question 53. Then if you armed a cylinder with knives, would you not of necessity have a cylinder with cutters?

To this interrogatory the witness says: I think I should.

Question 54. Don't you know you would?

To this interrogatory the witness says: That is my answer.

Question 55. Are the feed rollers in the machine described by Norcross mechanical equivalents for the pressure rollers described in the Woodworth patent?

To this interrogatory the witness says: I should say not.

Question 56. Are they used for substantially the same, or for substantially a different purpose?

To this interrogatory the witness says: I should think that the feed rollers in Norcross were used for feeding the board in, being a different function from that performed by the Woodworth pressure rollers.

Question 57. What do you call that structure in the Woodworth machine, upon which the board is placed as it moves under and against the planing cylinder, for the purpose of being planed?

To this interrogatory the witness says: I call it a bed or rest.

Question 58. May it not with propriety be called a bench or platform?

To this interrogatory the witness says: I think the other expressions describe it more fully.

Question repeated. It may be so called.

Question 59. If you were to take the Woodworth cylinder and hang its axis under the top of this bed, rest, or bench, with its edge appearing say one-fourth of an inch above the top of such bench or rest, removing from this combination all other devices, and what would this bench, bed, or rest in such case be?

To this interrogatory the witness says: It would be any thing you choose to call it. I do not know how to name it, for I do not know what it is there for, according to the question.

Question 60. Suppose the bench or rest and cylinder are so combined for the purpose, when a board is forced over the bench and against the cylinder, of having such board reduced in thickness one-fourth of an inch, what would you call this bed or rest in such a case?

To this interrogatory the witness says: I should call it a bed, or table, or rest, of course.

Question 61. If you were to place upon the top of this board pressure rollers to hold the board firmly against this bed or rest, while the board is passing over it, to be reduced one-fourth of an inch, as I have stated, would these pressure rollers so placed be mechanical equivalents for, or for substantially the same purpose as, the pressure rollers claimed and described by Woodworth.

To this interrogatory the witness says: As I see it, I think not.

Question 62. With such a combination as last supposed, would there be any means of reducing a board of unequal, to a board of equal thickness throughout?

To this interrogatory the witness says: I think not.

Question 63 With such a combination as last supposed, would there be any means of preventing the board, while being planed, from being drawn towards the knives as they cut from the planed to the unplaned surface of the board?

To this interrogatory the witness says: There would be only one side of the bed that would support the plank, the other end of the board would be as far above the bed as the cutters projected above the bed.

It would depend on the thickness of the board being planed; if the board was very thin, say a quarter of an inch thick, or a little thicker than the cut taken off of it, I think the board would run into the cutter or knives.

Question 64. For all practical purposes in planing boards, would not such a combination as last supposed, prevent the board from being drawn into the knives?

To this interrogatory the witness says: Not sufficiently to do good work.

Question 65. Is not this the only means used in the Norcross machine to prevent the board from being drawn into the knives?

To this interrogatory the witness says: I think not; I think the rest or bed *f*, in the Norcross machine, keeps the board from trembling or chattering, thereby obviating the difficulty in the before mentioned arrangement.

Question 66. What prevents the board from trembling or chattering in the Woodworth machine?

To this interrogatory the witness says: The bed, in combination with the pressure rollers.

Question 67. If instead of a pressure roller in the combination I have supposed of a cylinder hung under the bench, a pressure bar over the back part of the board were used, so wide as to extend its surface as far over the planed part of the board as the rest, as you call it, extends over the same part of the board in the Norcross machine, would this pressure bar prevent the board from chattering or trembling, as you say the rest does in the Norcross machine.

To this interrogatory the witness says: I think it would.

Question 68. You have sworn that in the combination of bench and cylinder last supposed, pressure rollers to hold the board firmly down

to the bench while being planed, would not be equivalents for the pressure rollers as used in the Woodworth machine, would a pressure bar, constructed as suggested in the last preceding question, be such equivalent for the pressure rollers as used in the Woodworth machine?

To this interrogatory the witness says: I think it would not.

Question 69. Is not the sole purpose then of the pressure rollers, as described and claimed by Woodworth, and as used in his machine, to prevent the board from being drawn into the knives while in revolution, and while cutting from the planed to the unplaned surface?

To this interrogatory the witness says: They are for that purpose and to keep the board flat on the bed, and for no other purpose that I see.

Question 70. Does not the distance which the rest *f* is placed from the cutting cylinder in the Norcross machine, determine the thickness of the board to be planed?

To this interrogatory the witness says: I think it does.

Question 71. What is that part of the Norcross machine called in his patent, on which the board to be planed is placed for the purpose of being passed over and against the cylinder?

To this interrogatory the witness says: It is called the bed or platform B and B^1.

Question 72. Is the board forced down upon it while being planed; and if so, by what means?

To this interrogatory the witness says: It is forced down by the rest *f*.

Question 73. Is the board, while being planed in the Woodworth machine, forced down upon the bed on which it is placed; and if so, by what means?

To this interrogatory the witness says: It is, by pressure rollers.

Question 74. Have you ever examined a copy of Woodworth's original patent, specifications, and drawings, of 1828?

To this interrogatory the witness says: I have now looked them over.

Question 75. Do you there find a machine described which will reduce and plane a board from an unequal to an equal thickness?

To this interrogatory the witness says: I think I do.

Question 76. State the means there described, by which a board of unequal thickness is made to pass through the machine on the carriage, and at the same time be held firmly against the carriage, while the board is undergoing the action of the knives.

To this interrogatory the witness says: I think it might be held firmly by the pressure rollers shown in the drawning, yet not very perfectly.

Question 77. Are there pressure rollers shown in the drawing?

To this interrogatory the witness says: I think the drawing represents pressure rollers.

Question 78. Give your reasons in full for so thinking.

To this interrogatory the witness says: I see rollers in said drawing which seem to set at right angles with the length of the board, and bearing on the top to be planed. I can conceive no other office that these rollers could perform, other than holding the board firmly to the bed.

Question 79. Are either of them yielding pressure rollers, as described or indicated in the drawing?

To this interrogatory the witness says: I do not see that they are.

Question 80. You say that you find a machine described in the specification and drawings which will reduce and plane a board from an unequal to an equal thickness; you say the board to be planed is to be held firmly for that purpose by pressure rollers; you say you do not see that either roller is a yielding pressure roller; this being so, how could a board of unequal thickness be planed in the machine described?

To this interrogatory the witness says: The rollers could not hold all parts of the board of unequal thickness firmly, without the first roller yielded to the inequalities of the board.

Question 81. Looking at the position of this first roller, as indicated by the drawing, and what, in your opinion, must it have been in the working machine?

To this interrogatory the witness says: I cannot form any opinion what it must have been from the drawing, as the drawing appears to be very imperfect.

Question 82. How, from that drawing, would a competent mechanic have constructed that roller, for the purpose of planing boards in the machine?

To this interrogatory the witness says: According to the way things are done in New York generally, he would have made it like the drawing, or would have returned the same as imperfect.

Question 83. How would you make it?

To this interrogatory the witness says: That would be owing to circumstances, and owing altogether to how the order was given to me. If the order stated that I should build a planing machine for the parties, after looking at the drawings, I should build it with yielding pressure rollers, with journals on either side, with some device to press them down, or towards the board. If to build after the drawing, I should build it like the drawing, as I have many other things, knowing that they were imperfectly done, or imperfect machines.

Question 84. If the order to you stated that you were to build a planing machine, how would you, after looking at the drawing of Roguin's first machine, arrange the bar x therein indicated; it appearing that the position of that is the same over the board, as the position of the roller in the Woodworth drawing, which, you say, you would make a yielding pressure roller?

To this interrogatory the witness says: I would make it a yielding pressure bar also.

Question 85. Do you discover in Manneville's description and drawing, a description of a machine for tonguing and grooving boards and plank?

To this interrogatory the witness says: I do.

Question 86. By what instrument is the board tongued and grooved in that machine, and in what manner is it held down on the bed of the machine, while undergoing the operation in that machine?

To this interrogatory the witness says: It is tongued and grooved by circular saws, assisted by a stationary knife to trim out the groove, and the board is held upon the bed, while undergoing the above operation, by a yielding pressure roller held down by a weight, in combination with dogs.

Question 87. Woodworth, in his patent of 1845, claims the combination of cutters for tonguing and grooving with pressure rollers to hold the board firmly while undergoing the operation. Is not this the same combination as that described by Manneville for the same purpose?

To this interrogatory the witness says: As the question is rendered, it appears to me to be the same; but Manneville uses dogs also.

Question 88. Does not Manneville, in his description of this machine, state that he uses a tool carrier armed with several irons, resembling much those of plough planes, which revolve upon an axle, and does he not with these tools also cut grooves in boards?

To this interrogatory the witness says: I do not see the word plough-plane here; the rest appears to correspond in substance. The tool I see here described, for dressing the corners of the tongue, is of the shape of a double triangle. As I see this specification, he does not cut grooves in the manner indicated in the question. Manneville says, here, "For the same purpose I also employ, &c." Now I do not see what he does with this; he does not say.

Question 89. Do the pressure rollers, described by Woodworth, hold the board firmly down to the bed of his machine, whilst the board is being tongued and grooved?

To this interrogatory the witness says: I think they do.

Question 90. By being thus firmly held down, is the board kept steady and prevented from being moved by the action of the tonguing and grooving cutters?

To this interrogatory the witness says: I think it is.

Question 91. Does the pressure roller, described by Manneville, hold the board firmly down to the bed of his machine, while such board is being tongued and grooved?

To this interrogatory the witness says: As I see it, I think it does.

Question 92. By being thus firmly held down, is the board kept steady and prevented from being moved by the action of the tonguing and grooving saws?

To this interrogatory the witness says: I should think it was.

The examination was here adjourned to the 20th instant, at ten o'clock, a. m.

March 20th, 1851. The examination of the same witness was continued.

Direct examination resumed.

Question 1. In the fourteenth cross interrogatory you were asked, whether, if the bar in the moveable carriage of Roguin's second ma-

chine was placed so high as not to touch the thickest part of a plank of unequal thickness, the machine would then reduce a plank to an equal thickness, and you answered "it would." Under the supposition of the question, would there be any mode of holding down the plank and preventing it from being lifted towards the cylinder?

To this interrogatory the witness says: There would not.

Question 2. Would a machine so constructed plane planks, and reduce them to an equal thickness?

To this interrogatory the witness says: As I see it now, it would not.

Question 3. Look at the 15th and 16th cross interrogatories, and say whether, in either of the suppositions contained therein, you contemplated, in view of your answer, the use of a yielding pressure bar?

To this interrogatory the witness says: I think I did.

Question 4. Do you find in either of Roguin's descriptions or drawings, either that he contemplated the reducing of plank from an unequal thickness, or the use of a pressure bar yielding relatively to the position of the planing cylinder?

To this interrogatory the witness says: I do not.

Question 5. You were asked in the 18th cross interrogatory, "From this description does it not appear that the axis of the cylinder in Roguin's second machine was fixed vertically?" If fixed vertically, would it be at right angles to the surface of the plank or parallel with it?

To this interrogatory the witness says: Parallel to the plane of the plank, and at right angles to the line of motion. I did not understand, when the 18th cross interrogatory was propounded, that the counsel meant to inquire whether the axis of the cylinder was placed horizontally and fixed vertically over the surface of the board, or I should have said that it was fixed vertically.

Question 6. Do you or not, find it stated in Roguin's second specification, that the carriage of the planing cylinder is to weigh about two hundred pounds, and, if so, would such a weight prevent the cylinder and the bar attached to that carriage from being lifted up?

To this interrogatory the witness says: I find the weight mentioned in the question in the specification as above, and do not think it sufficient to hold the cutters steady, while performing their action on the board.

Question 7. If that carriage were made sufficiently heavy not to be lifted up, and the bar were permanently attached to the carriage, could or not the machine reduce plank from an unequal to an equal thickness?

To this interrogatory the witness says: It could not.

Question 8. If required to make a burr cutter with the cutting edges separate from the stock, and secured thereto; could you or not, as a mechanic, make it?

To this interrogatory the witness says: I think I could.

Question 9. If the feed rollers in Woodworth's machine were placed as near the planing cylinder as the pressure roller, would or not one of these rollers perform in addition to feeding the function of a pressure roller to hold down the plank?

To this interrogatory the witness says: It would.

Question 10. In answer to the 68th cross interrogatory, you stated that a yielding pressure bar or rest placed on the opposite side of the plank from that acted upon by the planing cylinder, is not a mechanical equivalent of the pressure rollers in the Woodworth machine, will you give the reasons for that opinion?

To this interrogatory the witness says: Why, from the fact that this arrangement will not plane boards from an unequal to an equal thickness.

Question 11. If called upon to build a machine for planing plank from an unequal to an equal thickness, with rollers represented as having no connexion with the frame, how would you make the rollers, yielding or fixed?

To this interrogatory the witness says: If the order was given me in such a manner as to use my own judgment in the construction of the machine, I should put yielding pressure rollers on.

Question 12. If called upon to build a machine from a drawing representing a fixed bar above the plank, and no instruction as to its being intended to plane plank from an unequal to an equal thickness, would you make the bar to yield, or fixed?

To this interrogatory the witness says: Fixed.

Question 13. Look at figure 7 of the drawing of Roguin's second machine. From the position of the planing cylinder in that section, and the lines representing the thickness of the plank, what would you infer to be the direction of the rotating motion, with or against the motion of the plank, the feeding motion?

To this interrogatory the witness says: By the drawing the board moves the same way as the cutter revolves.

Question 14. Will it cut from the planed to the unplaned surface, or from the unplaned to the planed surface?

To this interrogatory the witness says: It cuts from the unplaned to the planed.

Question 15. Could or not a machine be made to work practically with the motion of the tools cutting from the unplaned to the planed surface?

To this interrogatory the witness says: It could not.

Question 16. In Roguin's first and second machines, is or not the plank secured to the carriage or bed by dogs?

To this interrogatory the witness says: It is.

Question 17. Turn to the 87th cross interrogatory, and also to Manneville's patent, and state by what instruments Manneville makes the tongue and the groove.

To this interrogatory the witness says: He makes them by saws.

Question 18. How many saws for the tongue, and how many for the groove?

To this interrogatory the witness says: Four saws for the tongue and two for the groove.

Question 19. Do the two saws complete and clean out the groove?

To this interrogatory the witness says: They do not.

Question 20. Is there another instrument for that purpose?

To this interrogatory the witness says: There is a series of chisels, to cut the centre out that the saws leave, and trim up the corners or edges.

Question 21. Do you or not consider the method of making a tongue by means of four saws substantially the same with the single cutter wheel, described in Woodworth's patent for the same purpose?

To this interrogatory the witness says: I think I do not.

Question 22. Do you consider the method of making the groove, by means of two saws, together with additional instruments for cleaning out the groove, substantially the same as the method of doing the same thing with a single cutter wheel?

To this interrogatory the witness says: I do not; I think the cutter wheel a decided improvement.

Question 23. Is the combination of the cutter wheels for tongueing and grooving with the pressure roller, as described in the Woodworth patent substantially the same, or an improvement on the combination of four saws for making the tongue and two for making the groove, with cleaning instruments in combination with a pressure roller?

To this inter rogatory the witness says: I think it an improvement —an important improvement, you might put it. I think that this statement that I make here, put side by side with an answer I made yesterday in my cross examination, will make something of a contradiction, as I understood the question referred to on cross examination. It asked whether or no I saw the same combination in the Woodworth as in the Manneville specification, not speaking of the knife, to which I answered "Yes."

Question 24. Do you now find that the combination of the Woodworth cutter wheels and pressure rollers is the same with the combination of the pressure roller, and same in Manneville, or including this with an improvement, or how otherwise?

To this interrogatory the witness says: It is the same, with an improvement.

Question 25. In Manneville's patent, do you find, in connexion with the same for forming the groove, the use of rotating cutter to clear out and complete the groove; or do you find the use of rotating cutters to make the groove without the saws?

To this interrogatory the witness says: I think I find rotating cutters for trimming the groove; but I do not find the cutters used solely for making the groove or tongue.

The direct examination here rested.

The cross examination here resumed.

Question 1. By what part of the specification or drawing of Roguin's first machine do you determine which way the plank is fed through the machine?

To this interrogatory the witness says: I do not think that I could determine which way the plank is fed through the machine. I should suppose that it was fed under the cross piece x to the cutter. The

reason why I suppose so is, that if fed the other way it would be liable to fly up into the cutter. It is fed under the cross piece *x* to the cutters, which can be determined from the situation of the chain or rope, and position of the windlass. It is fed, as I think, under the bar to the cylinder.

Question 2. Turn to the drawing of Roguin's first machine, as represented in plate 27, fig. 2, and state whether, supposing a person to stand with his right arm towards the side of the machine, as represented in said figure, on which the cranks are, and supposing said cranks to be turned, as a person so standing would naturally turn the same, would the motion so given by said crank to the planing cylinder cause the knives thereon to cut from the planed to the unplaned surface of the board, as the same is represented passing through the machine?

To this interrogatory the witness says: I think the motion so given would cause the knives to cut from the planed to the unplaned surface of the board.

Question 3. You have said that, in your opinion, the combination of cutters, with pressure rollers for tongueing and grooving, as described by Woodworth, is an improvement on the combination of saws and chissels, with pressure rollers for that purpose, described by Manneville; state all your reasons for considering this an improvement.

To this interrogatory the witness says: First, it takes but one instrument to bring about the same result, whereas it takes three in Manneville's. The improvements are, first, cheapness of construction, less liability to get out of order, easier to adjust, and much easier to repair; I think embodied in that is considerable improvement.

Question 4. Suppose you take out one of the two saws used by Manneville to cut the groove, and set the teeth of the other sufficiently wide to cut the same width of groove as was before cut with the two, would this be an improvement?

To this interrogatory the witness says: It would be better.

Question 5. Would it be any part of Woodworth's improvement?

To this interrogatory the witness says: I think it would approach Woodworth's. I think it would be about the same thing as Woodworth's, if taken in combination with the pressure rollers and leaving out the chissels. I think it would be an imperfect equivalent, because it would not make so smooth a groove, and not be so easy of repair.

Question 6. Do you mean to swear, that in your opinion the use of the combination of such a saw to cut the groove, with pressure rollers, would be any part of Woodworth's invention?

To this interrogatory the witness says: I think it would.

Question 7. Then if you should ascertain that such a combination of a saw to cut grooves, with pressure rollers to hold the board down, was used before Woodworth's invention, would he, in your opinion, be the first inventor of the combination claimed by him of cutters to cut grooves, combined with pressure rollers?

To this interrogatory the witness says: I should think not, but Woodworth's would be a decided improvement.

The cross examination here closed.

The direct examination resumed.

Question 1. How many days have you been under examination in this cause?

To this interrogatory the witness says: Four days.

Question 2. During the four days examination you have been under, has your attention been drawn repeatedly or otherwise to the specifications and drawings of the Woodworth patent, and the Norcross patent, and the French patents, called Roguin's and Manneville's, now under investigation?

To this interrogatory the witness says: It has.

Question 3. And after such a length of examination, have you found in either of the French patents an organized machine, that, in your judgment, would successfully plane a board, bring it from an unequal to an equal thickness throughout, with a smooth and finished surface, fit for the consumer's use, as is done at the present time by the Woodworth machine?

To this interrogatory the witness says: I have not.

Question 4. If a machine was constructed as you understand the description and drawings of either of the French patents, and you should take to a mill where such a machine was in use, a thousand boards to be planed in a perfect manner, and it should be done as such a machine would do them, would you consider the operator to have fulfilled the contract in accordance with the present usages of planing?

To this interrogatory the witness says: I don't think he could do so by such a machine.

Question 5. Do you find in either of the French descriptions of the patents, or the drawings annexed or belonging to them, a machine for tongueing or grooving a board, so intended to be organized as to receive a board without the use of clamps or dogs, and allow it to pass through the machine, and controlled by pressure rollers or analogous device, and thereby furnish the edge of the board with a tongue or a groove, as is now done by the Woodworth machine?

To this interrogatory the witness says: I do not.

Question 6. Would you in your judgment be willing to receive boards or planks done by those French machines, as the fulfilment of a contract for tongueing and grooving a lot of boards or plank for yourself?

To this interrogatory the witness says: I think I would not.

Question 7. Do you find in either of the French patents an organized machine for tongueing, grooving, and planing, like the one patented by Woodworth?

To this interrogatory the witness says: I do not, nor do I think that either of the French inventors was aware that the pressure rollers alone

would hold a plank sufficiently firm to be planed upon its face, or to be tongued and grooved, inasmuch as one of them uses dogs in combination with the pressure roller.

THOMAS J. SLOAN.

ROBERT B. CAMPBELL, *Not. pub.*

UNITED STATES OF AMERICA, *State of New York, ss.*

By this public instrument be it known, to all whom the same doth or may in any wise concern, that I, Robert B. Campbell, a public notary in and for the State of New York, by letters patent under the great seal of the said State, duly commissioned and sworn, dwelling in the city of New York, do hereby certify, that on the third day of April, eighteen hundred and fifty one, the annexed testimony was by me taken and reduced to writing in the presence of the counsel and the witness, and was afterwards copied and by me compared, read over by the witness, and by him signed in my presence; and I further certify, that the counsel of the respective parties agreed that all objections to the relevancy and competency of the questions put by either party, and the answers given by the witness, should be taken at the hearing the same, as if now noted.

In testimony whereof I have subscribed my name and caused my notarial seal of office to be hereunto affixed, the third day of April, in the year of our Lord one thousand eight hundred and fifty-one.

Witness' attendance, 1 day.

Do. travel 20 miles and return.

ROBERT B. CAMPBELL, *Notary public.*

Circuit court of the United States, district of Massachusetts.

BROOKS and ANOTHER
vs. } In equity.
FISKE and ANOTHER.

STATE, CITY AND COUNTY OF NEW YORK, *ss.*

On this third day of April, in the year eighteen hundred and fifty-one, before me, Robert B. Campbell, a public notary of the State of New York, by letters patent under the great seal of the said State, duly commissioned and sworn, and residing in the city of New York, came the plaintiffs in the above entitled cause, by Charles M. Keller, esq., of counsel, who requested to have taken the deposition of Loren L. Johnson, a witness in the above entitled cause, produced by the plaintiffs, and the defendants in said cause appearing by E. W. Stoughton, esq., of counsel, the said witness was by me duly sworn and examined on the following interrogatories to him propounded, and made answers, which are written after the several interrogatories:

Question 1. What is your name, age, place of residence, and occupation?

To this interrogatory the witness says: My name is Loren L. John-

son; my age is 52 years; my place of residence is Hastings, on the Hudson, New York; and my occupation is a machinist.

Question 2. Were you acquainted with William Woodworth, deceased, and when and where did you become acquainted with him?

To this interrogatory the witness says: I was; I was first acquainted with him in Sheffield, Massachusetts; that was previous to 1825.

Question 3. Did you ever, and when, meet him in Hudson, in the State of New York, and under what circumstances?

To this interrogatory the witness says: In eighteen hundred and twenty-five I moved to Hudson, and there we renewed our acquaintance. He was there engaged in a ship block factory, on a place called Storchia creek.

Question 4. Do you know whether the said Woodworth invented, or was engaged in inventing, any machinery; and if so, for what purpose, and at what time?

To this interrogatory the witness says: He was engaged in inventing a planing machine. In eighteen hundred and twenty-seven, I think it was, he got hurt in the block factory, and he came to the shop where I was at work, and said, Loren, I am going to invent a planing machine, and remarked that it was a laborious work to do by hand to dress flooring boards, and wished me to be engaged in the construction of it?

Question 5. Did he construct a machine for planing; and if so, when and where, and what connexion had you with it?

To this interrogatory the witness says: He did construct one, and it was built at Dunbar's shop. I think his name was Daniel Dunbar. I was employed as a mechanic. It was in operation in eighteen hundred and twenty-eight.

Question 6. About what time of the year eighteen hundred and twenty-eight?

To this interrogatory the witness says: It was completed in June or July, eighteen hundred and twenty-eight, I think, from the recollection I have of dates.

Question 7. What became of that machine?

To this interrogatory the witness says: It was taken to the Dry dock steam saw mill, as it was called, in the city of New York.

Question 8. Did you see it there; and if so, when?

To this interrogatory the witness says: I put it up there, and worked the machine. I went with it from Hudson. As I said before, it was probably in June or July that it was tried in Hudson. I cannot recollect when it was that I went with it to New York, but I have at home a written account of the whole transaction.

Question 9. Was it in the summer or fall of eighteen hundred and twenty-eight?

To this interrogatory the witness says: It was in the summer.

Question 10. How long after it was taken to New York before it was set in operation there?

To this interrogatory the witness says: Very probably it was a week before it was in successful operation. I had good help.

Question 11. In what capacity where you employed in connexion with that machine?

To this interrogatory the witness says: I was employed as foreman.

Question 12. Will you describe that machine?

To this interrogatory the witness says: It was a vertical cylinder. The plan was to run a board on each side of the cylinder at the same time; the tongueing and grooving tools were horizontal, to groove and tongue the edges of the board.

Question 13. Describe the rest of the organization of the machine.

To this interrogatory the witness says: The board was kept from the cylinder by means of pressure rollers.

Question 14. Did the machine plane and reduce planks from an unequal to an equal thickness?

To this interrogatory the witness says: It did; it was so arranged as to make use of different thicknesses of board or plank; the tongueing and grooving was also arranged for the same convenience of different widths.

Question 15. How, and by what means, did the rollers make pressure on the plank?

To this interrogatory the witness says: At first it was by use of springs against the roller, but they were not sufficient, and levers were added.

Question 16. Did you ever see a model of that machine, and if yea, by whom was it made, and at what time?

To this interrogatory the witness says: I made a model of it. It was completed previous to December, eighteen hundred and twenty-eight.

Question 17. For what purpose was that model made?

To this interrogatory the witness says: It was to exhibit the principle of the machine. It was a working model.

Question 18. Do you know what became of that model?

To this interrogatory the witness says: The last I saw of it, it was in the Franklin Institute in Philadelphia.

Question 19. When did you last see that model?

To this interrogatory the witness says: On January the twentieth, eighteen hundred and fifty-one.

Question 20. How do you know that it is the same model that you made in eighteen hundred and twenty-eight?

To this interrogatory the witness says: I recognised it as my work from its appearance. I also tried bitts where I had sunk screws, to be certain that it was the same size.

Question 21. Is that model like the machine that you have described as worked at the Dry dock?

To this interrogatory the witness says: It is, except that only one board was dressed at a time.

Question 22. In the original machine at the Dry dock, and in the model to which you have testified, did the cutters move in the direction of the feeding motion of the plank or against it?

To this interrogatory the witness says: They went against the feed.

Direct examination here closed.

Cross examination commenced.

Question 1. Who employed you to work on the machine you have mentioned?

To this interrogatory the witness says: Mr. Woodworth employed me; but I did not go to work until Mr. Strong became paymaster.

Question 2. Was the machine made in Dunbar's shop?

To this interrogatory the witness says: It was; in the city of Hudson.

Question 3. What part of it did you build?

To this interrogatory the witness says: I worked both on the wood and the iron, particularly on the cutting tools.

Question 4. What proportion of the whole machine did you construct?

To this interrogatory the witness says: I can't say I constructed any; I worked to his orders.

Question 5. Who else worked on the machine besides you?

To this interrogatory the witness says: My brother was one, the other names I do not remember at Hudson. I think there was one by the name of Stillman, but I am not certain that I have his name right. He was a wood worker.

Question 6. How long *was* you engaged working on the machine before it was tried?

To this interrogatory the witness says: It would be difficult for me to say the exact time. It was in progress of being built when I went to work on it. It might have been two, three, or four months. I can't say how long I worked on it.

Question 7. Who made the carriage on which the board moved in that machine?

To this interrogatory the witness says: It was made there by the hands, and I acted as foreman; but I cannot tell the names of the hands who planed up the plank. It was made there at Dunbar's.

Question 8. For whom did you act as foreman?

To this interrogatory the witness says: I was employed by Woodworth for that purpose, and Mr. Strong was paymaster.

Question 9. Who employed the others who worked on the machine?

To this interrogatory the witness says: So far as I know, it was Woodworth.

Question 10. How long did you work this machine at the Dry dock?

To this interrogatory the witness says: Some seven or eight months, I guess.

Question 11. Did you make any alterations in it during the time you worked it?

To this interrogatory the witness says: There were some improvements made; where parts were not sufficiently strong they were

made stronger, and levers were added; at the Dry dock, cutters were put on to the grooving tools to reduce the plank to a width.

Question 12. How long, after you went to New York, was it that levers were added?

To this interrogatory the witness says: It was done very soon; for it could not do the work without it. It could not be considered to be in successful operation until after they were added.

Question 13. Did you plane two boards at one operation with this machine?

To this interrogatory the witness says: No, sir, we did not; athough it was prepared for it; there was not sufficient power on the belt to drive the cylinder to plane two at a time.

Question 14. Did you continue to use the machine with the cylinder vertical while you remained working it?

To this interrogatory the witness says: Yes, sir, that machine was no otherwise than with a vertical cylinder.

Question 15. Did you use, with the levers you added, weights to press the rollers against the board?

To this interrogatory the witness says: Yes, sir, that was the object of applying them.

Question 16. How heavy were these weights, as near as you can recollect?

To this interrogatory the witness says: Probably fifty pounds to a roller.

Question 17. How long was the arm of these levers?

To this interrogatory the witness says: I should think about three feet.

Question 18. How many levers did you put on in all?

To this interrogatory the witness says: Only two; they separated on one roller; the other was stationary, to suit the thickness of the plank.

Question 19. By what contrivance did you annex these levers, so as to act upon this roller?

To this interrogatory the witness says: By attaching the fulcrum of the lever to the frame; then a few inches from the fulcrum was the power attached to this roller. The weights were on the other end of the lever.

Question 20. Did the weights press upon a vertical or upon a horizontal line?

To this interrogatory the witness says: The levers were horizontal of course; the weights hung vertical.

Question 21. By what device were these weights made to press the roller against the plank?

To this interrogatory the witness says: There was an iron to suit each end of the roller cords attached to them, that came outside of the frame, and there attached to the lever.

Question 22. Do you recollect that you had keys to key up the rollers in this machine?

To this interrogatory the witness says: Yes, sir, and they were used

for that purpose; and these rollers that were keyed were set stationary to the thickness of the board planed. The other rollers that had the levers attached were also keyed, to prevent the rollers from going too far back, and prevent them from being able to get the board in.

LOREN L. JOHNSON.

UNITED STATES OF AMERICA,
State of New York, ss.

By this public instrument be it known, to all whom the same doth or may in any wise concern, that I, Robert B. Campbell, a public notary in and for the State of New York, by letters patent under the great seal of the said State, duly commissioned and sworn, dwelling in the city of New York, do hereby certify, that on the 20th day of March, and on the 3rd and 4th days of April, 1851, the annexed testimony was by me taken and reduced to writing in the presence of the counsel and the witness, and was afterwards copied and by me compared, read over by the witness, and by him signed in my presence. And I further certify, that the counsel of the respective parties agreed that all objections to the relevancy and competency of the questions put by either party, and the answers given by the witness, should be taken at the hearing, the same as if now voted.

In testimony whereof I have subscribed my name and caused my notarial seal of office to be hereunto affixed, the fourth day of April, in the year of our Lord one thousand eight hundred and fifty-one.

Attendance of witness four days.

ROBERT B. CAMPBELL,
Notary public.

Circuit court of the United States, district of Massachusetts.

BROOKS AND ANOTHER
vs.
FISKE AND ANOTHER. } In equity.

STATE, CITY, AND COUNTY OF NEW YORK, *ss.*

On the 20th day of March, in the year 1851, before me, Robert B. Campbell, a public notary of the State of New York, by letters patent under the great seal of the said State, duly commissioned and sworn, and residing in the city of New York, came the plaintiffs in the above entitled suit, by Charles L. Woodbury, esq., of counsel, who requested to have taken the deposition of John T. Bruen, a witness in the above entitled cause, produced by the plaintiffs; and the defendants in said cause appearing by E. W. Stoughton, esq., of counsel, the said witness was by me duly sworn and examined on the following interrogatories to him propounded, and made answers which are written after the several interrogatories.

Question 1. What is your name, age, and place of residence?

To this interrogatory the witness says: My name is John T. Bruen; my age is 34 years; I reside in the city of New York.

Question 2. Have you devoted any attention to mechanics, and in what branches, and how long have you been operatively engaged. Also have you devoted any attention and care to the examination of machinery, with a view to compare the principles and originality involved therein, and do you conceive yourself expert thereat?

To this interrogatory the witness says: I have devoted considerable attention to the science of mechanics; I have been operatively engaged for the last four years, about, particularly in machines to work in wood, and in machinery generally; among the former I have devoted particular attention to cut figures in relief on wood, my own invention.

I have been a theoretical mechanic ever since I was 16 years of age.

I have compared every machine that has fell under my observation, with a view to ascertain their principles, and originality involved in their construction.

Question 3. Are you familiar with any foreign language, and if so, with how many; and are you acquainted with the French language so intimately that you are able to read works on mechanical subjects, and understand the terms of art therein, when written in the French language; and have you been accustomed to read such works?

To this interrogatory the witness says: I am familiar with the French and German languages; German is my native language, but I was educated in French-Switzerland, where French is the language spoken. I am acquainted with the French language so intimately, that I am able to read works on mechanical subjects, and understand the terms of art therein, when written in the French language; and I have been accustomed to read such works.

Question 4. Are you an inventor yourself, and do you conduct a machine shop in this city?

To this interrogatory the witness says: I am an inventor, and conduct the machine shop, No. 68, Duane street, in this city.

Question 5. Have you examined certified copies, from the Patent office at Washington, of the specification of a patent of Mr. Roguin, and the drawing thereto annexed; also of a specification and drawings of an invention of Mr. Manneville, as extracted from the foreign work called the Brevet d'Invention, and have you made a translation of the same?

To this interrogatory the witness says: I have examined the papers purporting to be such extracts, and have written my name on the back of a certificate attached to each of such certified copies; and I have made a translation into English of each of them.

The certified copies are marked exhibits C and D.

Question 6. Are said translations accurate versions of the originals? If so, please mark in the margin of the same, in each of said translations, your name.

To this interrogatory the witness says: They are accurate, and as near as possible true and literal translations, inasmuch as they cannot be literally translated without ambiguity.

I will mark them.

These translations are marked exhibits E and F.

Question 7. Have you made working drawings from the drawings of said machines of Roguin and Manneville in said certified copies; and have you built, or are you building, accurate models of the said machines as represented in said drawings and specifications?

To this interrogatory the witness says: I have made working drawings after tracings attached to said certified copies, and according to the specifications attached thereto. I have superintended the building of models of the two Roguin machines, according to the said working drawings, and am now superintending the building of models of the Manneville machine.

Question 8. Are you acquainted with the reissued patent granted to William W. Woodworth, and have you examined the same, or a certified copy thereof?

To this interrogatory the witness says: I am somewhat acquainted with the reissued patent, but have never examined a certified copy thereof.

Question 9. Have you seen and examined the so-called Woodworth planing machine as now in use in this city, and are you well acquainted with the construction thereof, and the principles involved therein?

To this interrogatory the witness says: I have seen and examined it, and know the construction thereof, and the principles involved therein.

Question 10. Please describe the principles involved in the Woodworth planing machine with reference to its construction and mode of operation.

To this interrogatory the witness says: The principles involved are those of a cylindrical cutter head or tool carrier, well known to mechanics, and those of continuous feed and pressure rollers. Its mode of operation is to give the said cutter head a rotating motion against the one of the feed and pressure rollers, for the purpose of preventing the cutting edge of the knives coming in contact with the grit usually found on the surface of the wood.

Question 11. What are the effects produced on the board or plank by being passed through the Woodworth planing machine?

To this interrogatory the witness says: The effects are that the machine planes, and tongues, and grooves the plank at the same time, or separately, I believe.

Question 12. Whether or not is the plank or board at the same time reduced to an equal thickness and width, at the same time that it is planed with a smooth and equal finish?

To this interrogatory the witness says: That is the natural consequence of a well constructed machine made on the before mentioned principles.

Question 13. Do you find in the first machine described by Roguin the same combination of principles effecting the same results? And if they differ, state the difference.

To this interrogatory the witness says: I do not find the same combination nor the same effect produced.

Roguin uses a rotating burr, cut out of the solid metal, instead of the cylindrical cutter head, to which separate knives are attached.

The inventor omits to show a means of holding the board while it is to be operated upon, except at its extremities.

As far as the effect is concerned, a rotating tool cannot produce an even and smooth surface on a board, unless the same is prevented from lateral as well as vertical motions or vibrations. Besides the burrs shown are inadequate in effect and incapable of resisting the friction of such a speed as they ought to have to produce the desired effect. A principle of this (Roguin's) machine is a reciprocating motion to the carriage.

Question 14. What is the distinction in form between a burr and a cylindrical cutter head to which separate knives are attached?

To this interrogatory the witness says: The burr is cut out of the solid metal, and its periphery filed into cutting points or edges. The cylindrical cutter head, or rather the body thereof, is generally made of cast iron of divers shapes suited to the purpose they are intended for. The knives, or cutters, are separate steel blades, which are attached thereto by means of bolts or otherwise, at such an angle as is calculated to produce the intended effect.

Question 15. Whether or not are the teeth of the burr, as described in Roguin's first machine, set at right angles to the shaft or at a tangent thereto?

To this interrogatory the witness says: The teeth of the burr in Roguin's first machine are not described at all in the specifications or the tracings; they appear to be at a tangent, but I cannot say precisely at what degree. The teeth indicated in the specification, for a blade cannot be cut out of a solid, they are indicated in the specification as being cut obliquely.

The literal translation of the French word "lance," means "blade," but the meaning of the word here is "tooth," because it is qualified by the context.

Question 16. Please look at the description of the second machine of Roguin where he speaks of the carriage *f*, and say if he does not there describe the position of the tooth of his first machine, and what do you understand by that description?

To this interrogatory the witness says: When I answered the preceding question, stating that the teeth were not described in the specification, I had reference to the specification of Roguin's first machine.

There is this paragraph describing the carriage marked *f*, in the specification of the second machine, which is an improvement on the first. In this paragraph the inventor says, that the tooth in the first machine is perpendicular to the axis.

There is in the specification of the first machine, a part which says that they are cut obliquely; this refers to page 2 of the specification; I referred before to page 6.

Question 17. Look at the drawings which are attached to the first machine of Roguin, and say if the cutting edges of the burr are not designated as diagonal or spiral to the shaft, and whether or no the

phrase describing them as being cut obliquely (which you have referred to) has any bearing on this fact?

To this interrogatory the witness says: The periphery of this tool is cut obliquely, that is, to the central line of the shaft.

Question 18. Whether or no does that part of the specification of Roguin's first machine, which states that the teeth of the burr are cut obliquely, mean to express the position of the line of the cutting edge with reference to the central line of the shaft, or whether it means the angle which is given to the edge with reference to the axis of the instrument?

To this interrogatory the witness says: I am led to believe that the word "obliquement," has reference to the direction of the cutting edge of the teeth as compared to the central line of the shaft.

Question 19. After your attention has been thus called, whether or not do you conceive that the teeth of the burr in Roguin's first machine, are set like saw teeth without a tangential or planing angle, or with a planing angle?

To this interrogatory the witness says: I conceive that the teeth are set much like those of a saw, not altogether without a cutting angle, neither with a sufficient tangent to plane to a smooth surface. On the tracing attached to the certified copy, the teeth are represented as varying a few degrees from the radial lines.

Question 20. Look at the drawing of Roguin's first machine, and the specification, and say how that machine operates to tongue and groove a board.

To this interrogatory the witness says: The boards are represented on their edges, the burr marked *p* operates on the board marked *t* to produce the tongue, and the burr marked *o* operates upon the board marked *s* to produce the groove.

Question 21. What is the use or purpose of the bar *x*, figure 2?

To this interrogatory the witness says: To guide the boards in such a manner as to meet the respective tools calculated to operate on them.

Question 22. Do you or not find in the specifications and drawings of Roguin's first machine, any indication of a yielding pressure being used to prevent the material being drawn upward towards the axis of the burrs, by their action?

To this interrogatory the witness says: I do not find any.

The examination was here adjourned until the 21st instant, at 10 o'clock, a. m.

March 21st. The examination was here adjourned until the 3d of April, at 11 o'clock, a. m.

April 3d, 1851. *The examination of the same witness was continued.*

Question 23. In Roguin's first machine do you find the cutters for the surface of the plank and for the tongueing and grooving so arranged that they could all operate on one plank at the same time?

To this interrogatory the witness says: I do not.

Question 24. When the planks are to be presented for tongueing and grooving, how are they placed on the carriage, flatwise or edgewise?

To this interrogatory the witness says: Edgewise.

Question 25. In what manner are they held edgewise on the carriage?

To this interrogatory the witness says: The tracings attached to the certified copies do not show any manner of holding them, nor does the specification describe any.

Question 26. May not the cross bar or guide marked *x*, have been intended for that purpose?

To this interrogatory the witness says: It may have been intended or it may not have been intended, for if it had been so intended it need not have gone all across the frame work of the machine.

Question 27. In your opinion, is the said bar or guide to hold the plank down on the carriage, or to guide it laterally, and to keep it in a line as it moves towards the cutters?

To this interrogatory the witness says: I am of opinion that it is intended to guide the board laterally, or, in other words, to prevent the boards, when being tongued and grooved while on its edge, from falling down flatwise. Its purpose seems to me to present the board so that the respective burrs will make the tongue or the groove in the middle of the thickness of the board.

Question 28. Is there a known distinction, among mechanics, between a burr cutter and a plane for cutting by a shaving operation?

To this interrogatory the witness says: There is such a distinction known.

Question 29. Does the burr cutter shave or scrape, when applied to wood?

To this interrogatory the witness says: A burr cutter is more generally used for scraping operations. It has more the effect of a saw upon wood than a plane. By planing I mean cutting off the surface of timber in shavings.

Question 30. In your opinion, would the cutter in Roguin's first machine plane by cutting off the surface in shavings?

To this interrogatory the witness says: I think not.

Question 31. Turn your attention to figure 7 of the drawings of Roguin's second machine, and say what is the direction of motion of the planing cylinder relatively to the feeding motion, and whether it cuts from the rough to the smooth surface, or from the planed to the unplaned surface?

To this interrogatory the witness says: Its motion is with the board, and it cuts on the rough surface, as is seen by the tracing of the board, being thicker behind than before the cutting edge, in this figure.

Question 32. In Roguin's second machine, in what manner is the planing cylinder applied in the machine?

To this interrogatory the witness says: It is supported on a cast iron

carriage to which two pinions are attached, by means of which, together with the aid of an endless chain, a forward and backward movement is given to it; while the cylinder itself, together with a pulley, sets on the same shaft and receives a rotating motion by means of a rope.

Question 33. How is this carriage held down on the frame?

To this interrogatory the witness says: There is no mechanical means shown to hold it in position, and the inventor appears to calculate on its weight to effect that object.

Question 34. What is about the weight of that carriage, indicated in the specification?

To this interrogatory the witness says: The specification says 110 killogrammes, about 240 pounds avoirdupois.

Question 35. In your opinion, would, in practice, that weight be sufficient to prevent the carriage and cylinder being lifted up by the action of the planes on the plank?

To this interrogatory the witness says: I think not.

Question 36. In this second machine of Roguin's, do you find any guide or bar placed over the plank to hold it down whilst being planed?

To this interrogatory the witness says: The inventor, in the specification he gives of his second machine, on page 8 of the certified copy, says, the guide, represented in the first machine by the letter *x*, is, in the new or second machine, carried by the carriage. The tracings attached to said certified copy show this carriage in plain and lateral section, but neither the one or the other shows any mechanical contrivance to hold or guide the board.

Question 37. Do the drawings represent this guide or bar as making a permanent part of the carriage, or adapted to yield therein?

To this interrogatory the witness says: They show it to be a permanent part thereof, the whole carriage being represented as one piece.

Question 38. Supposing the under surface of the said bar or guide to be so located as to rest on the surface of the plank to be planed, and making a permanent part of the carriage, would the machine be then adapted to reduce a plank from an unequal to an equal thickness?

To this interrogatory the witness says: It would not, for the reason, that, if the board be of an unequal thickness, and said bar be so located as to bear upon its inequalities, and being a permanent part of the carriage supporting the plane or cutter, it would result that the whole carriage would be lifted up, together with the tool, and would therefore not equalize the inequalities of the board.

Question 39. In Roguin's second machine, is the plank to be planed put on a carriage or a permanent bed of the machine?

To this interrogatory the witness says: It is placed on an adjustable bed adapted to the different thicknesses of a board.

Question 40. How is this adjustment effected?

To this interrogatory the witness says: It is adjusted vertically by means of 4 screws which support the said bed, and its position is ascertained by four graduated plates attached to the interior angles of the

frame. Lengthwise it is adjusted by means of 2 set screws held in 2 iron brackets, which are secured to the interior part of the frame.

Question 41. Do these modes of adjustment adapt the machine to planing planks from an unequal to an equal thickness?

To this interrogatory the witness says: Yes, if the plane was held in position and the planks prevented from vibrating.

Question 42. Have these modes of adjustment any thing to do other than to set the machine for a given thickness of planing?

To this interrogatory the witness says: No, they have not, and do not appear to be intended for any purpose.

Question 43. By what means are the planks secured to the bed in this machine?

To this interrogatory the witness says: By means of a crochet marked x, on one extremity, and by means of dogs or moveable pincers on the other extremity.

Question 44. The board being held down to the bed at the ends alone, will it be prevented from vibrating towards the middle of its length while there acted on by the planing cylinder?

To this interrogatory the witness says: I think it will not be prevented by those means alone, but, on the contrary, they will have a tendency to give it a curvature towards the centre.

Question 45. Do you find in the specification or drawings of the second machine, any other mode of holding down the plank, which will be adapted to reducing a plank from an unequal to an equal thickness?

To this interrogatory the witness says: I do not find any.

Question 46. What would be the effect produced by the planing cylinder on a plank not held down to the bed?

To this interrogatory the witness says: If not held at all it will be thrown off, in whatever direction it receives the blow of the cutting tool or cylinder.

Question 47. If held on to the bed at the ends alone, what would be the effect?

To this interrogatory the witness says: That would depend on the direction given to the motion of the cylinder; then, in whatever direction this motion might be given, it would leave inequalities on the material.

Question 48. Do you find in Roguin's second machine the same combination as in the Woodworth re-issued patent for planing and reducing planks from an unequal to an equal thickness?

To this interrogatory the witness says: I do not.

The direct examination here closed.

The examination was here adjourned until the 4th instant, at 10 o'clock, a. m.

April 4th, 1851. *The cross examination of the same witness commenced.*

Question 1. For what purpose is the bar x placed in Roguin's first machine?

To this interrogatory the witness says: I believe it is placed for the purpose of guiding the boards while standing on their edges, and while being tongued and grooved.

Question 2. Did Roguin describe in his first machine any method of tongueing and grooving?

To this interrogatory the witness says: He does not precisely describe a method; he merely infers in the description of the details of his machine, that certain figures, including figures *s* and *t*, on page 3 of the certified copy, make on the boards one a tongue and the other a groove.

Question 3. Look at drawing No. 2 in Roguin's first machine, and state whether the bar, *x*, there represented, does not from its position tend to prevent the board from being drawn up by the action of the planing cylinder?

To this interrogatory the witness says: The tendency of this bar in the said machine need not prevent the board from being drawn up, since the action of the burrs operating upon it are from the top down, and from its position, being represented as a permanent part of the frame work, it could not have such a tendency, except on perfectly parallel pieces.

Question 4. How do you know that the action of the burrs is from the top downwards?

To this interrogatory the witness says: From the construction of the machine.

Question 5. Whether the burrs cut up or down, would depend on the way the carriage was moved, would it not?

To this interrogatory the witness says: Yes, sir.

Question 6. How do you know which way the carriage was intended to move?

To this interrogatory the witness says: In the first place by a paragraph of the specification, on page 2 of the certified copy. There the inventor says the carriage is drawn by a windlass marked *d*, the axis of which carries on its extremity a wheel marked *e*, into which mashes a pinion marked *f*, the axis of which receives a crank marked *g*. The cords in the tracings attached to said certified copy, clearly show by their position attached to the said windlass, in which direction the carriage is to be drawn.

Question 7. Then in Roguin's first machine he tongued and grooved at the same time he planed, did he not?

To this interrogatory the witness says: I believe, from the construction of said machine and from the description thereof, that he did not pretend to plane and tongue and groove at the same time, for the bar *x*, together with the position of the planks he indicates, would render such operation impossible.

Question 8. As the bar *x* and boards, which you say are being tongued and grooved in that machine, are not indicated in drawing No. 2, could that bar guide these boards thus being tongued and grooved as they pass through the machine on their edges?

To this interrogatory the witness says: The inventor does not show

any mode in which he contemplates guiding or holding the board during such operation; and the drawings attached to the certified copy represent a single bar of wood permanently attached to the frame and going all across it, and the efficacy for such a purpose of said bar must depend upon its construction; and since no construction is shown, it must be left to the imagination what it could or could not do.

The cross examination here closed.

The direct examination here resumed.

Question 1. Have you made models of Roguin's first and second machines from the certified copies furnished by the patent office, to which you have been examined?

To this interrogatory the witness says: I have made working drawings from the tracings attached to said certified copies, and have built models according to said working drawings and the specifications.

The tracings are imperfect, and I have had to have recourse to the specifications.

Question 2. Will you produce the models, and write your name on them?

To this interrogatory the witness says: I do produce them, and do write my name on them.

They are marked exhibits A and B.

JOHN T. BRUEN,
ROBERT B. CAMPBELL,
Notary public.

UNITED STATES OF AMERICA,
State of New York, ss.

By this public instrument be it known, to all whom the same doth or may in any wise concern, that I, Robert B. Campbell, a public notary in and for the State of New York, by letters patent under the great seal of the said State, duly commissioned and sworn, dwelling in the city of New York, do hereby certify, that on the twenty-first and twenty-second days of March, 1851, the annexed testimony was by me taken and reduced to writing in the presence of the counsel and the witness, and read over by the witness, and by him signed in my presence; and I further certify, that the counsel of the respective parties agreed that all objections to the relevancy or competency of the questions put by either party, or the answers of the witness, should be taken at the hearing, the same as if now noted.

In testimony whereof I have subscribed my name and caused my notarial seal of office to be hereunto affixed, the twenty-second day of March, in the year of our Lord one thousand eight hundred and fifty-one.

ROBERT B. CAMPBELL,
Notary public.

1100.

Circut court of the United States, district of Massachusetts.

BROOKS & ANOTHER
vs.
FISKE & ANOTHER.

CITY AND COUNTY OF NEW YORK,
State of New York, ss.

On this 21st day of March, in the year 1851, before me, Robert B. Campbell, a public notary of the State of New York, under letters patent of the said State, duly commissioned and sworn, and residing in the city of New York, came the plaintiffs in the above entitled suit, by Charles L. Woodbury, esq., of counsel, who requested to have taken the deposition of Harvey Waters, a witness in the above entitled cause, produced by the plaintiffs; and the defendants in said cause appearing by E. W. Stoughton, esq., of the city of New York, their counsel, the said witness was by me duly sworn and examined in the following interrogatories to him propounded, and made answers, which are written after the several interrogatories.

[To this interrogatory the witness says.]

Question 1. What is your age, name, and place of residence?

My age is 46 years; my name is Harvey Waters; and I reside in Derby, Connecticut, village of Birmingham.

Question 2. Have you already been examined as a witness for the plaintiff, by a commission issued in this cause; and were the volumes No. 23 and 41 of a French work, called the Brevet d'Invention, shown you on that examination, or were you examined on any extract therefrom?

I believe I have been examined on such a commission in this cause. The volumes referred to were not shown to, nor examined by me, on that examination, nor any extracts therefrom.

Question 3. Are you familiar with the French language, and accustomed to read works on mechanics, written in French, and familiar with the terms of mechanic art in that language?

I read the French language a little; I do not think I am familiar with the technical phrases used in that language; I sometimes read such works in French, and with the aid of a dictionary I have no difficulty in making out any article.

Question 4. Turn your attention to vol. 14, page 111, of the Brevet d' Invention, and read the description of Manneville's machine, and look at the drawings therein referred to.

I have now examined these descriptions and drawings of these two machines, and have examined them before, and I believe that I now understand them.

Question 5. Look at the description of his planing machine, and say if in that description you find designated the methods of the Woodworth planing machine, and whether a machine, built according to this description, could produce the same results as the Woodworth machine does?

I do not find designated the same method in the planing machine there described. I think that a machine, built according to that description, would not produce the same results as the Woodworth machine does, as I understand it.

Question 6. Look at vol. 23, Brevet d'Invention, and the descriptions of the two machines of Roguin, at pages 207, and the drawings thereto annexed, and say if you understand the same.

I have examined these, and I think I understand them. The first description is a little obscure.

Question 7. Do you understand Roguin's first planing machine; if so, will a planing machine, constructed as there described, produce the same results as the Woodworth machine, or would it embody the same methods?

I believe I understand the description, as far as it goes. There seems to be no distinct method of holding the wood to be cut firmly on its bed; that being uncertain, the identity of the two is uncertain.

Question repeated.

The answer, I believe, is sufficient, because it is uncertain how the wood is to be held.

Question 8. Whether or not do you find in the first machine of Roguin any yielding pressure to control the board, whilst being cut in combination with a planing cylinder, like the Woodworth machine?

I do not find any yielding pressure at all, either in connexion with such a tool, or any other.

Question 9. Whether or not the second planing machine of Roguin, as there described, can it produce the same results as the Woodworth machine, or embody the same methods, with a fixed cylinder, and yielding pressure on each side of the cylinder, for the purpose of controlling the board while being planed?

The second machine, described by Roguin, cannot produce the same results as the Woodworth machine, for the reason that it does not embody the same mode of operation, not having the local pressure on the two sides of the cutting instrument.

Question 10. What kind of a plane or cutting instrument does Manneville describe for planing his board in his planing machine—vol. 41, p.

From the whole description of the working of that machine, I judge that the cutting instrument must have been similar to the common jack plane.

The direct examination here closed.

Being cross examined

Question 1. You say, on your direct examination, that you see no distinct method described in Roguin's first machine for holding the wood to be plained firmly down to the bed, and that, therefore, the identity of this machine with Woodworth's cannot be determined; explain fully what you mean by this.

In the Woodworth machine, as I understand it, there is a local

pressure immediately in the neighborhood of the cutting instrument, and both before and behind it, for the purpose of holding the board firmly against the carriage or bed piece, as the case may be, and under the action of the cutting instrument, in all the length of the board. The result of the machine being to plane the board to a uniform thickness in all its length, merely by the manual means of presenting the board to the machine.

Question 2. If there were means, described substantially as they are in the Woodworth machine, for holding the wood to be planed firmly to the bed of Roguin's first machine, would the two machines, in such case, be substantially identical?

I believe they would.

Question 3. What is that in Roguin's machine placed over the board, and marked *x* in the drawing thereof?

A cross piece of wood, called the guide.

Question 4. Is it placed over the planed or over the unplaned surface of the board?

It is placed over the unplaned surface of the board.

Question 5. Does this cross piece appear to be flat or round?

There is no method of determining its form that I see. There is no cross section in the drawing, nor is there any description of its cross section in the description that I see.

Question 6. It may, then, for ought you know or discover, be a roller, may it not?

It may have been a roller, for ought I know.

Question 7. Do you see any means described for making it a pressure roller?

I do not.

Question 8. What is requisite to constitute a pressure roller in mechanics?

Either a weight, or spring, or some other fastening of the roller.

Question 9. Is it requisite to constitute a pressure roller in mechanics, that it should be yielding on its axis?

It is not.

Question 10. State why.

The material to be pressed may be yielding, the roller may be yielding in itself; that which makes the pressure opposite to the roller may be yielding, and the roller permanent.

Question 11. In all of these cases, which you have supposed in your last answer, would the roller be, in mechanics, properly called a pressure roller?

Perhaps strictly not; but that must always depend, more or less, upon the purpose and organization of the connexion.

Question 12. Suppose the roller used to be yielding in and of itself, as you have suggested, would such a roller in mechanics be appropriately called a pressure roller?

I think so.

Question 13. If you were, therefore, to withdraw from the Wood-

worth machine the pressure rollers which are there arranged, so as to yield upon their axis, and in their stead place over the board rollers which would yield in and of themseves, would these be substantially the same as those removed?

I think so, but practically inferior.

Question 14. Could a roller, not yielding in and of itself, or upon its axis, be used in the Woodworth machine, if it were placed on that side of the cylinder to which the board is to be first presented to be planed?

Yes.

Question 15. State how.

If a permanent roller were placed in front of the cutting instrument, and on the same side of the board with the cutting instrument, there might be on the opposite side of the roller any yielding pressure; but it would be necessary, in that case, that the cutting instrument and bed piece should advance and recede with the yielding pressure to and from the line of cut, so as to maintain a uniform thickness of the board when finished.

Question 16. Take the Woodworth machine, as constructed with an unyielding bed under the pressure roller, and remove the pressure roller, and in its place insert one which does not yield in and of itself, or upon its axis, and would the machine work?

The machine would work if there was no considerable variation in the thickness of the board from end to end, before it came to the machine; if there was any considerable variation, it would be impractical.

Question 17. Would a machine so arranged be of any practical value for planing such boards, as you have ordinarily seen planed by machinery?

For some boards it would not, for some it would; it would be much inferior to the machine with a suitable yielding pressure.

Question 18. Would a machine thus arranged combine any part of Woodworth's invention?

I think so.

Question 19. What part; describe it particularly.

It would combine a part of the two local pressures.

Question 20. What two local pressures?

One before and one behind the cutting instrument.

Question 21. How large is the cross piece x in Roguin's first machine to be made?

I see no means of telling with any degree of accuracy. It appears by the drawing to be of the length of the breadth of the machine, its horizontal size across about the diameter of the cutting instrument.

Question 22. Can you tell how thick it is?

There is no means of determining, that I can see, by the drawing or description.

Question 23. In such a case, if called upon to construct the machine, would you not make this cross piece of the thickness and strength appropriate to the function it should perform?

I should endeavor to.

Question 24. What function should a cross piece so placed perform, in order to make a working planing machine?

That would depend upon the construction of the machine altogether.

Question 25. If the machine were to be constructed, in all other respects according to Roguin's description of his first machine, what function should this cross piece perform, in order to make a working machine to plane boards?

It could not possibly make a working machine to plane boards without some other function, than I see there described.

Question 26. Question repeated.

I say that I do not conceive what function it could have to make it a working machine, without some other function in the machine than is described.

Question. 27. Remove the cross piece *x* from Roguin's first machine, and what would be required to make it a working machine to plane boards?

Some method of holding the boards firmly on the bed piece.

Question 28. Would anything else be required that you can see?

I think not. The cutting tool is badly constructed, but it might be made to work.

Question 29. What function, then, should a cross piece or cross pieces, placed over the top of the board in that machine, exercise, in order to make it a good working machine?

Two cross pieces, if you choose to call them so, placed one before and the other behind the cutting instrument, affording a local pressure on the board before and behind the cutting instrument, would make that, in principle, a good working machine.

Question 30. Would it be necessary to make local pressure on that part of the board which had passed under the planing cylinder, and had been planed, if the cross piece was the same distance above the bed as the thickness of the board, after being so planed?

If I understand the question, yes.

Question 31. Would not a roller or bar thus placed, which did not yield upon its axis or in or of itself, answer the same purpose?

Yes.

Question 32. Would such a bar or roller, in mechanics, be called a pressure bar or roller?

I suppose so. If it afforded pressure on the board, it would certainly be a pressure bar or roller; it would be local pressure, at any rate.

Question 33. Is the cross piece *x* in the first machine designed, in your opinion, to afford pressure on the board to be planed?

From the first description of that machine, and the second description of a modification of it, I judge that its purpose was to keep down the board in the centre, the two ends being held to the bed piece by dogs.

Question 34. Question repeated.

With the above explanation, I should say "yes."

Question 35. You have sworn that a bar or roller, which did not yield in and of itself, or upon its axis, would, in mechanics, be called a pressure bar or roller; you have sworn that the cross piece x, in your judgment, is designed to afford pressure on the board; is this piece, in mechanics, a pressure bar or roller?

If that cross piece had the function that I suppose, it might, with propriety, be called a pressure bar. I cannot conceive that it was a roller, nor do I consider it important whether it was or not.

Question 36. You have sworn that if you remove out of the Woodworth machine, as constructed with an unyielding bed under the pressure rollers, these pressure rollers, and insert in their place rollers which do not yield in or of themselves, or upon their axis, that a machine thus arranged would combine a part of Woodworth's invention, and when asked what part, you said the two local pressures, and when asked what two local pressures, you said one before and one behind the cutting instrument; you have sworn that you find in Roguin's first machine one of these local pressures; is this local pressure, so found in Roguin's first machine, Woodworth's invention?

If I have sworn as above, I am mistaken. In the first place, I think that question as to taking out the local pressure was as to taking out one of the yielding pressures, for with both of the local pressures it would be a Woodworth machine of inferior construction, in my opinion. We have; I said that that same local pressure found in the Woodworth machine, either one or more, was found in Roguin's. The purpose seems slightly differen , to my mind. Some of the functions of the pressure in the Woodworth machine, being supplied in the Roguin's by the dogs at each end of the board. The difficulty, to my mind, here seems to be in confounding the terms "local pressure," "yielding pressure," and "pressure." The local pressure may or may not be a yielding pressure; but in the Woodworth machine, as constructed, two local pressures are necessary, one before and one behind the cutting instrument.

Question 37. Place a roller unyielding in itself, and unyielding upon its axis, over a solid unyielding bed, and is that roller, in a mechanical sense, capable of giving pressure?

If you pass a board between the two, which is slightly elastic of itself, the roller would become a pressure roller, in my opinion, so as the space between the two was properly adjusted to the thickness of the board.

Question 38. Is it not essential to the working of the Woodworth machine, with an unyielding bed, that the roller on that side of the planing cylinder, to which the board is first presented to be planed, should be a yielding pressure roller, in order to plane boards from an unequal thickness?

I believe I have said, in answer to a former question, that if there was any considerable variation in the thickness of the board from end to end, the pressure must accommodate itself to that variation; but if the board be barely thicker at one edge than at the other, and pretty

uniform in its thickness from end to end, the rollers may be permanent and do good work, but this is not a good modification of the Woodworth machine.

Question 39. Is it not the appropriate function of that roller to yield, for the purpose of planing such boards as are ordinarily planed?

That roller in the Woodworth machine should have provided to it a yielding pressure. The appropriate function of that roller is to hold the board, and if the board varies in thickness, it must have the yielding power, in order to perform its function.

Question 40. Look at the bar *x* from its position in the drawing of Roguin's first machine; is it not its appropriate function to yield, for the purpose of planing boards from an unequal to an equal thickness?

What its function was in the machine, I cannot say further than I have said. If it was for pressure, it would be better to yield than to be permanent.

Question 41. You have said that in your opinion it was to make pressure on the board; was it not, then, its appropriate function to yield, for the purpose indicated in the last question?

Its appropriate function, as I suppose, was to make pressure; but that function would be better carried out by furnishing it with a device to allow it to yield.

Question 42. You have sworn that, in constructing the cross bar *x* for the first machine described by Roguin, you would so construct it that it should perform its appropriate function; in what manner would you so construct it; would you make it yielding or unyielding?

If its functions were what I supposed, I should make it yielding, with my present knowledge.

Question 43. Have you ever examined the copy, specification, and drawings annexed to the patent granted to William Woodworth, in 1828?

I think I have never examined the original specification. I have examined a copy of the drawings said to have been attached to it.

Question 44. Look at the copy, specification, and drawing referred to in the last question, and state whether you find there indicated or described pressure rollers to hold the board while being planed in Woodworth's machine?

I do. I find indicated two rollers on each part of the double machine, one before and one behind the cutting instrument, which I judge to have been used as pressure rollers.

Question 45. Do you find described or indicated in said drawing, or copy, or specification, any means to make those rollers, or either of them, yielding pressure rollers?

I do not.

Question 46. How would a competent mechanic, in your judgment, construct that machine from the drawing and specification, with yielding or unyielding pressure rollers?

If I may speak for myself to that question, with my present knowledge of the machine and its purposes, I should make the pressure

rollers yieding pressure rollers. What any mechanic would have done at the date of this invention, with the knowledge of any machine then in existence, which has come to my knowledge subsequently, it would be impossible for me to say; but I think that if he had been well informed on all those machines, he would have made it with a yielding pressure.

Question 47. Inform a competent workman, who had never seen a planing machine, that it was to plane boards from an unequal to an equal thickness, and let him see from the drawing you refer to that one of the rollers was on that side of the cylinder to which the board was first presented to be planed, and would he, in your judgment, have made the roller, under which the board was to pass to reach the cylinder, yielding or unyielding?

If you mean by "competent workman" "competent machinist," with a good knowledge of the arts as they now exist, he would undoubtedly make the pressure roller a yielding pressure roller.

Question 48. Inform such a workman or machinist, as you have mentioned in your last answer, who had never seen a planing machine, that it was to plane boards from an unequal to an equal thickness, and let him see the position of the bar x in Roguin's first machine, and would he, in your judgment, in constructing that machine, make the bar x, indicated in the drawing, yielding or unyielding?

The first description of Roguin is obscure and incomplete; but if such a machinist took the same view of the purpose of the cross bar as I have taken, I think he would have made it a yielding pressure bar.

The examination was here adjourned to the 22d instant, at $9\frac{1}{2}$ o'clock, a. m.

March 22d. The examination of the same witness was continued.

Question 49. Are circular saws and cutters designed to work upon wood by a rotating motion the same, or different tools or instruments, in mechanics?

That must depend on their organization into the machine, and their purpose; if they are organized the same, they would be the same.

Question 50. Suppose both were organized in a machine for the purpose of tongueing and grooving boards and plank, would they then be the same, in your opinion?

Their organization and purpose being the same, they would certainly be the same, in my opinion.

Question 51. Do you find in Manneville's specifications and drawings, or in either, a description of a machine for tongueing and grooving boards?

I do.

Question 52. What instruments does he describe for that purpose?

Mostly circular saws. There is an addition of a vibratory plane to clear the groove, after the saws have cut down the sides.

Question 53. How is the board described as being laid down, whilst the tongue and groove are being cut?

It was necessary to dog or fasten the board firmly on the carriage, and in addition to this, and for the purpose of preventing any curvature to the board, there was a local yielding pressure upon it in the neighborhood of the cutting instruments.

Question 54. In what manner was this local yielding pressure created?

With a roller, levers, and weight—the levers much in the manner of a steelyard.

Question 55. Was this roller, as described, a pressure roller?

It was.

Question 56. Were these saws combined, as described by Manneville, with this pressure roller, cutters, or substantially the same as cutters?

They were cutters, and substantially the same as cutters would have been if organized in the same manner into the machine.

Question 57. Was not this combination, as described by Manneville, of cutters with the pressure roller substantially the same as the combination of cutters with pressure rollers, as described by Woodworth?

I should say not.

Question 58. Why not; state all your reasons for this opinion.

The pressure in the Woodworth machine is fully sufficient and equal to the purpose of holding the board in position under the action of the cutting instruments, in all its length; while in the Manneville machine, the dogs were necessary in addition to the pressure. The difference in the result being practically apparent in the Woodworth, it being necessary only to present the board to it; while in the Manneville two more manipulations are necessary; 1st, the dogging of the board upon the carriage previous to its being tongued and grooved, and disengaging it therefrom after the operation is completed. In a further description of the improvement of the machine, however, he has provided an organization, by which the board is disengaged from the dogs by the action of the machine. I think of no other reasons for the opinions I have expressed.

Question 59. If, then, instead of the dogs described by Manneville, a sufficient number of pressure rollers to hold the board firmly, while being tongued and grooved, were placed in the machine, for that purpose, described by him, would the combination, in that case, of pressure rollers with circular saws be the same as the combination for the same purpose described and claimed by Woodworth?

It will, perhaps, be a sufficient answer to that question to say, in addition to what I have already said, that if the cutting instruments, with their appropriate motive fixtures, described by Woodworth, for tongueing and grooving were taken from his machine, and the cutting instruments of the Manneville, with their appropriate motive fixtures, substituted in their place, the machine would then be a Woodworth machine.

Question 60. Suppose a person were to remove from the Wood-

worth machine all the pressure rollers but one, and were to confine the board by dogs or clamps, not making pressure upon the surface of the board, except with the one remaining roller, would the machine, if so used for tongueing and grooving, in your opinion, combine any part of Woodworth's invention?

It would combine a part of the machine invented by Woodworth, but strictly speaking, I suppose no part of Woodworth's invention. If I understand the question properly, the machine would then be the Manneville machine.

Question 61. Suppose a person were to remove from the Woodworth machine all the pressure rollers but one, and were to confine the board by dogs or clamps, not making pressure upon the surface of the board, except with the one remaining roller, would the machine, if so used for planing, in your opinion, combine any part of Woodworth's invention?

It would then be a Roguin machine, if my supposition of Roguin's intention is correct, and not a Woodworth machine.

The cross examination here closed.

The direct examination resumed.

Question 1. Take the end view of Roguin's first machine, marked fig. 4. Place a straight edge across the section, and state whether the cutting edges of that cylinder were set radially from the axis, or how, otherwise.

The front faces of those cutting edges were radial, both by the drawing and by the letter press description.

Question 2. From the apparent distance between those cutting edges on the periphery, would that cylinder perform the office of shaving or of scraping?

That would depend much on the quantity of wood to be cut away. If the quantity was small, and the edge of the tool quite sharp, I think it might make a tolerable cut; but if the quantity of wood to be removed were considerable, it might be said to be more of a scrape than a cut. But these are comparative terms, as I understand it.

Question 3. Suppose you take a planing iron, and set it in its stock with its front face perpendicular to the face of the plane, and move it over a board, will it scrape, or cut, or shave; what would be the term used in mechanics to express the operation?

That tool would still be a plane, according to my analysis; but for ordinary purposes of very bad construction.

Question 4. Do you find in Roguin's description of his first machine any roller mentioned?

I do.

Question 5. Look at the description of the wooden cross bar, marked *x*, in Roguin's specification to his first machine, and say whether the language used there in the drawing made to represent this device, indicated to a mechanic of the usual competent skill of that day, whether he should construct a bar or a pressure roller.

The letter-press and the drawing indicate this as a cross bar of wood, called a guide. I do not see how it could possibly have been a roller, if the language in the drawing is to be taken as an indication of what it was.

Question 6. Is there any thing in this specification or drawing which would indicate that that cross bar *x* was to be made a yielding or a fixed bar?

I see nothing in the letter-press or in the drawing to show how this instrument was affixed to the machine at all; it is barely represented in the drawing as being above the frame work of the machine, and above the pieces to be wrought.

Question 7. Do you, in Roguin's first machine, find the Woodworth planing machine, after your long and careful examination on this subject?

No.

Question 8. Have you seen any reason to change the opinions you have expressed on your direct examination?

No.

HARVEY WATERS,
ROBERT B. CAMPBELL,
Notary Public.

UNITED STATES OF AMERICA,
Massachusetts district, ss.

[L. S.] The circuit court of the United States, within and for the Massachusetts district.

To Edward G. Loring, esquire, United States commissioner, residing in Boston, Massachusetts.

Know ye, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed of Edmund N. Morse, a witness to be examined on behalf of the complainants, and to be used in a certain cause now pending in said court, wherein Artemas L. Brooks et al., complainants, in equity, versus John Fiske et al., respondents.

And to this end, at certain days to be by you appointed for that purpose, to cause said witness, as aforesaid, to be brought before you, and said witness, while present before you, to examine carefully on oath touching the premises. And when you shall have taken the examination as aforesaid, to reduce, or cause the same to be reduced, to writing, and to be subscribed by said witness in your presence. And the same, so taken and subscribed, to return, together with this commission, and your doings herein enclosed, sealed and directed to the circuit court aforesaid, to be holden at Boston, as soon as the same shall have been executed.

In testimony whereof we have caused the seal of the said circuit court to be hereunto affixed.

Witness the honorable Roger B. Taney, at Boston, this first day of March, in the year of our Lord one thousand eight hundred and fifty one.

ISAAC O. BARNES,
Clerk of the circuit court of the U. S., Massachusetts district.

N. B. You shall not, except by the consent of parties, in writing, permit either party to attend at the taking of the deposition, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the deponent whilst giving his deposition in answer to the interrogatories annexed to this commission. And you shall take such deposition in a place separate and apart from all other persons, and permit no person to be present during such examination, except the deponent and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the deposition to writing. And you shall put the several interrogatories and cross interrogatories to the deponent in their order, and take the answer of the deponent to each, fully and clearly.

CIRCUIT COURT OF THE UNITED STATES,
District of Massachusetts.

BROOKS et als.
vs.
FISKE et als.

Interrogatories to be exhibited to Edmund N. Morse, a witness for the plaintiff, residing in the district of Massachusetts, at Boston.

Question 1. What is your name, age, and residence, and how long have you resided there?

Question 2. Whether or not, in the year 1828, you had charge of the Block factory, at Livingston Manor, below Hudson, in New York, and whether you then knew Wm. Woodworth, and under what circumstances was it that you knew him?

Question 3. Whether or not you knew any thing of a planing machine, which Woodworth was then constructing at Hudson, and what did you know or see about it at that time?

Question 4. Did you afterwards see the machine during the year 1828, and where?

Question 5. Whether or not you worked on or attended this machine at the Dry dock, in New York, and on whose suggestion or request; and whether or not you then became familiar with said machine and its mode of operation?

Question 6. Upon what materials did said machine there usually operate; and how was the work performed by the machine, both in regard to the quality of work and the capacity of the machine to do work, without accident or stoppage to itself?

Question 7. Was the lumber assorted as to its width or not; and was it all of uniform thickness?

Question 8. Was this the identical machine that you saw at Hudson, or otherwise; and whether or not were there adjustable pressure rollers in the machine, that adapted themselves to feeding boards of unequal thickness?

Question 9. How were these pressure rollers operated; and was there more than one machine at the Dry dock, and in what condition were they?

Question 10. What gearing was used for the pressure and forwarding rollers?

Question 11. Whether or not the planks planed in said machine were reduced to an equal thickness and were well smoothed?

Question 12. Whether or not you saw Mr. Woodworth at the Dry dock whilst you were there, and how often?

Question 13. Whether or not you are exact in the dates which you give, and how do you fix them?

Question 14. Whether or not the machine that you operated on at the Dry dock was substantially the same as that now in use and known as Woodworth's?

Question 15. Have you ever testified on this subject before?

State any other matter or thing which you may know that can benefit either party in this cause. CHAS. LEVI WOODBURY.

Cross interrogatories to Edmund N. Morse.

1. When did you begin working at said Block factory; what did you do there; when did you leave there; when did you go, and what did you next do; were you intimate with said William Woodworth at the Block factory, or how otherwise?

2. When did you first see said Woodworth's machine at Hudson? State the time as exactly as you can. What condition was said machine then in; what parts were then made, and what were not made; what parts of the machine were made, within your knowledge, at Hudson; who worked on the machine at Hudson; did Daniel Dunbar make any, and what parts of the machine, at Hudson; did the machine run any at Hudson; if so, how did it work; had it any, and what defects?

3. State when you commenced working on the said machine at the Dry dock; what did you, and when you left off; what condition the machine was in when you first saw it at the Dry dock; what changes, if any, had been made in the machine since you last saw it at Hudson; what changes, if any, were made in it, within your knowledge, at the Dry dock, and who made them, and why they were made, and when; be particular and exact; what work was done with said machine at the Dry dock; how was the lumber fed into the machine; was it by means of a carriage, or how otherwise; was the board fed into the machine with the cut, or against the cut of the rotating planes?

4. When, where, and under what circumstances, did you first see adjustable pressure rollers, if at all, in said machine; how many were

there; what was their size, position, and office in the machine, and of what material were they made; who put such rollers into the machine, and why were they put in; did you ever converse with said Woodworth about the rollers; if so, when, where, and what did he say?

5. Who put up said machine, or any and what other like it, at the Dry dock; at whose expense were they run; who worked on them, or with them, while you were there; how much lumber do you know to have been dressed by the Hudson machine at the Dry dock; what became of said machine; when did you last see it; how long was it used; was the second machine built like the first, or how otherwise; state all the alterations, and why they were made; were these rollers and a carriage used in said machine, or either of them, at the same time; how was the carriage moved, and how were the rollers driven?

6. How were said rollers adjusted, and how were they made to press; did said Hudson machine plane, tongue, and groove boards at the same time, and at one operation; had said machine any guide or straight edge, or how was the board kept in a line for tongueing and grooving?

7. What had said Woodworth to do with the machine or machines at the Dry dock; were said machines his, or run by him; when was the second machine at the Dry dock built, and by whom? State particularly all the material parts of each of said machines at the Dry dock, and state the position and office of each part in said machines.

8. Did you know, while at the Dry dock, anything of Mr. Emmons' patent for a planing machine; was the second machine at the dock built according to said Emmons' patent, or how otherwise; are you acquainted with the machines now in use, known commonly as the Woodworth machines; if so, are they made according to the said Woodworth's patent, or according to the said Emmons' patent; are they made like the said machine at Hudson, or the first machine at the Dry dock, or how otherwise?

9. State when, where, and how often, and in what cases, and under what circumstances, and at whose request, you have testified before on this subject; have you any and what interest, direct or otherwise, in the Woodworth machine, or patent, or the result of this suit; state with whom, if any body, you have conversed on this subject preparatory to this examination.

J. GILES, *for Defendants.*

The deposition of Edmund N. Morse.

1. My name is Edmund N. Morse, and I am fifty-seven years of age; I reside in Chelsea, in the county of Suffolk, and commonwealth of Massachusetts. I have resided in said town a little over six months, but at Boston and Charlestown thirty-nine years, excepting about two years, when I lived in New York.

2. In the year 1828 I had charge of said Block factory, and I knew William Woodworth, he was then one of the company of the Liv-

ingston block factory. I was introduced to him by Col. Livingston before, a very few days before, I took charge of said factory, which was 8th July, 1828.

3. I knew that Wm. Woodworth was having a planing machine built at Hudson when I got there; I saw it in Dunbar's shop, who was at work on the machine for Woodworth. It was called a working model. It was not completed when I first saw it, but it was afterwards sufficiently completed to operate; but I never happened to see it operate, from first to last. I saw the machine all of twenty times; it was carried from Hudson, and I should think the latter part of September, 1828, to the Dry dock at New York.

4. I saw it in the Dry dock at New York, in the latter part of November, or first part of December, 1828.

5. I assisted in operating the machine at the Dry dock in New York, in the latter part of November, or early part of December, 1828, for something like a week or ten days. I took hold to assist for Johnson, and at his request, and I did then become familiar with the machine and its operation.

6. The machine usually operated on white pine boards and planks of various width and thickness. It did its work as well, generally, though not so expeditiously, as it has been done since. In planing wide boards or planks there was a vibration or jar, which has been since obviated by placing the cylinder in a horizontal position; and as to capacity of working without stoppage or accident was about the same, proportionally, as now.

7. It was of different width and thicknesses, but for very wide boards we turn[ed] different cutters, or attached different cylinders.

8. It was the identical machine with alterations by lengthening it out and supporting it, and there were adjustable pressure rollers attached to the machine to prevent the plank or board from being drawn towards the cylinder or cutting knives in the act of planing, and these rollers adjusted themselves to the thickness of the planks.

9. The action of the planks by them caused them to revolve, and spiral springs, and when necessary, additional weighted levers, kept the pressure rollers up to the inside surface of the planks, toward the cutting knives. There were parts of two other machines built and painted over with green paint, and I saw them on the same floor with the machine in operation. The two machines painted I never saw in operation, and they had not the knives, cylinder R, attached to them when I saw them.

10. There was no gearing on the pressure rollers, the gear or feeding power was a rack and pinion, which carried the feeding carriage and board right by the rollers and knives, and between them.

11. They were.

12. I probably saw him every day while I was [there,] and three or four times a day generally; he was in and out continually, and with a Mr. Strong and another person at times.

13. I am certain of the dates, as I have the day and hour I took

charge of the Block factory, from dates in books which I have made at the times of the dates, and from letters, and these I have examined two or three times, and in reference to these investigations. By dates at home I fix the time when I was at the Dry dock within a few days, certainly within three. I left Hudson on the business of the company and went to Connecticut, thence to New York, and it was my first visit to that city.

14. The machine is the same in principle as now, though then the cutting cylinder was vertical, and the pressure rollers were not geared; now the cutting cylinder is horizontal and the pressure rollers are geared.

15. I have testified on this subject before, three times before a jury, and three times, I believe, before a commissioner.

I remember nothing now.

Answers of cross interrogatories.

1. I began working at the Block factory 8th July, 1828. I was foreman of the establishment. I left there for good Sept., 1830, and shortly after I moved my family to the city of New York, and after being there a short time I took charge of a machine shop for the manufacture of thrashing machines. I was intimate with William Woodworth at the Block factory, so far as acquaintance went.

2. I saw the machine in the process of building at Hudson, as early or earlier than the middle of July, 1828. When I first saw it they had got it together and were finishing off the frame work, and the first time I saw it I don't recollect seeing anything but the frame; the other parts were made afterwards, and added or fixed to the frame. Every part of the machine except the frame was added after I saw the frame, and within my knowledge, at Hudson, in Dunbar's shop; the frame I did not see before it was put together, or in the act of manufacture. Mr. Dunbar and Mr. Loren L. Johnson, and others, say four or five, whose names I don't remember, worked on the machine. What particular parts Mr. Dunbar did I don't know; he worked generally on the machine under the direction of Mr. Woodworth, as I saw on various occasions. I did not see it operate myself at Hudson, though I saw the peculiar chips it had made, and so I knew it had operated. I knew of no defects in it, and I heard of none.

3. I commenced working with the machine about the latter part of November, and the beginning of December, 1828, aiding Mr. Johnson in tending the machine, which was planing, tongueing, and grooving Albany pine lumber. I left off in something more than a week; what I did was gratuitous, and off and on at times. When I first saw it at Hudson it was operating. The only change made since I saw it in Hudson was that rods were lengthened to accommodate the plank; there was no change in the machinery except lengthening the rack. After I first saw it no other changes were made in it at the Dry dock. The object of extending the rack was to accommodate the plank; the work it did, I have stated. There was a feeding carriage operated up-

on by rack and pinion, which carried the planks to the action of the cylinder or cutting knives, and against the cut of the rotating planes.

4. I saw the pressure rollers first at Dunbar's shop, in Hudson, in July, 1828, under the circumstances I have stated, and I think there were five, vertical and within the feeding carriage, and on the side next the cutting cylinder. Their office was to prevent the planks being drawn toward the cutting cylinder in the act of planing; three were made of hard wood, the two next, and on either side of the cylinder, were of iron. I did not see the rollers put into the machine; they were put in for the purpose just stated; the machine can't work without them. I do not recollect conversing with Mr. Woodworth about the rollers, though I did about the machine generally. I heard him giving directions to Dunbar or Johnson about the fitting of the rollers to the machine; I don't recollect his words.

5. I was not at the Dry dock when any of the machines were put up there; I don't know who put them up. It was run under the direction of Mr. Woodworth, Mr. Strong being paymaster, but I don't know how the expense was borne finally. Johnson and myself and two or three other persons worked on the machine; I *said* worked at the Dry dock; the names of the other persons I don't know. From the best of my remembrance certainly over three thousand feet, and from that to ten thousand feet, were dressed by the Hudson machine at the Dry dock. I left the machine operating at the Dry dock, and don't know what became of it; I last saw it in December, 1828; I don't know how long it was used. I never saw at the Dry dock but one complete machine; the frames there described by me as painted were, as I was told, intended for horizontal cylinders; they were larger, wider, stouter, and heavier than the Hudson machine; there were no other alterations. The frame of the original machine was not considered strong enough for its work; there were pressure rollers and a feeding carriage used in the machine; the carriage was moved by a rack and pinion, and the rollers revolved by the action of the planks against them.

6. The rollers were adjusted by being fitted to permanent boxes on the frame of the machine; in these boxes there were slits, and at each end of the pressure rollers there were journals turned which were fitted to these permanent boxes; the inside surface of the journal next the cylinder was acted upon by spiral springs, the pressure roller acting on the inside of the plank next the cutting knives, to prevent the plank from being drawn toward the cylinder; when the power of the spiral spring was not sufficient, weighted levers were added. The Hudson machine did plane, tongue, and groove boards at one operation; it had a guide or straight edge, and this kept the plank in a straight line for tongueing and grooving; such was its object and effect.

7. Mr. Woodworth was there, generally superintending the work, taking the same interest in it as a man generally would in his own business, and other gentlemen came with him. Mr. Strong came; and I have seen him pay money to Mr. Johnson. Who owned the machines, or what bargain had been made for their operation, I cannot

say. The frames at the Dry dock were built and painted when I saw them; who built them, I know only by hearsay. The Hudson machine at the Dry dock consisted of a frame, a rotating cutting cylinder, rotating cutting, tongueing and grooving knives or cutters; rack and pinion for feeding power; feeding carriage, for carrying forward the lumber to the action of the cutting knives, with pressure rollers particularly described before, with driving pullies, belts, etc. The cutting cylinder was in a vertical position; the tongueing and grooving cutters were in a horizontal position; the pressure rollers were in a vertical position, and the rack and pinion were in a horizontal position; and the feeding carriage carried the board forward on its edge so that the surface of the plank was vertical to the knife; the upper head of the cylinder was adjustable, so as to accommodate, by being moved, short or long knives; and on the original machine there were twelve knives; the office of each of these parts I have pointed out by the names attached to them.

8. I never had heard, when at the Dry dock, of Mr. Emmons' planing machine or patent; nor do I know any thing about Emmons' patent; and therefore I can't tell whether a machine built is like it or not.

9. I testified in the circuit court in Boston, in 1848, at request of J. G. Wilson, and the same year, in the following fall, at Philadelphia, at Mr. Wilson's request, and Baltimore, in December, 1849, at Wilson's request. And I gave a deposition before Mr. Robb, clerk of the circuit court, and again before the present commissioner, and in these cases, I think, at the request of Mr. Brown; and then before Commissioner Hillard; and the parties I have forgotten. I have not, and never had, any interest, direct or indirect, or expectant, in the Woodworth machine or patent, or this suit, nor have I concerted with any one preparatory to this examination. A man was introduced to me, and asked me to come; I have forgotten his name; I had never seen him before.

E. N. MORSE.

UNITED STATES OF AMERICA,
Massachusetts district, ss.

[L. S.] The circuit court of the United States, within and for the Massachusetts district, to Edward G. Loring, esq'r, United States commissioner, residing in Boston, Massachusetts.

Know ye, that reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed, of Thomas Blanchard, William Raymond Lee, Jeremiah Myers, and others, Harvey Waters, William C. Hibbard, and others, witnesses to be examined on behalf of the complainants, and to be used in a certain cause now pending in said court, wherein Artemas L. Brooks et al. are complainants in equity, versus John Fiske et al., respondents.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you, and each witness, while present before you, to examine carefully on oath touching the premises. And when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence. And the same, so taken and subscribed, to return, together with this commission and your doings herein enclosed, sealed and directed to the circuit court aforesaid, to be holden at Boston, as soon as the same shall have been executed.

In testimony whereof we have caused the seal of the said circuit court to be hereunto affixed.

Witness the honorable Roger B. Taney, at Boston, this thirty-first day of August, in the year of our Lord one thousand eight hundred and fifty.

EPHRAIM BROWNE, JR.,
Clerk of the circuit court of the United States,
Massachusetts district.

N. B.—You shall not, except by consent of the parties, in writing, permit either party to attend at the taking of the depositions, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the deponents whilst giving their depositions in answer to the interrogatories annexed to this commission. And you shall take such depositions in a place separate and apart from all other persons, and permit no person to be present during such examination, except the deponents and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the depositions to writing. And you shall put the several interrogatories and cross interrogatories to the deponents in their order, and take the answer of the deponents to each, fully and clearly.

CIRCUIT COURT, UNITED STATES.

ARTEMAS L. BROOKS et al.
vs.
JOHN FISKE et al.
} In equity.

Interrogatories on behalf of the complainant to Thomas Blanchard, William Raymond Lee, Jeremiah Myers, and others.

1. What is your age and profession, and have you had any, and if so, what means and opportunities of acquiring an intimate knowledge of mechanical principles so as to enable you to form a judgment as to the distinctions between mechanical principles or modes of operation, and mere mechanical changes or substitution of mechanical equivalents; and state also whether you have ever been examined in court as an expert in patent causes. Make your answers full and explicit.

2. Have you ever examined the specification and drawings of letters

patent granted to W. Woodworth, on the 27th day of December, 1828, for a machine for planing and grooving plank and reducing the same to an equal thickness, as the same was reissued to W. W. Woodworth, administrator of William Woodworth, deceased, on the 5th day of July, 1845; and if yea, state whether you understand the same.

3. Will you state what, in your opinion, is the principle or mode of operation which distinguishes the Woodworth planing machine, as described and represented in the said reissued patent?

4. Have you examined the specification and drawings of a machine for planing plank, patented to Nicholas G. Norcross, on the 12th day of February, 1850, in which is contained what is alleged to be a description of a machine invented by one Hill; and if yea, state wherein the said Hill machine differs from or resembles in principle or mode of operation, the Woodworth machine before referred to.

5. Does the moveable pressure roller in the said machine of Hill make pressure on the surface of the plank so as to control it whilst acted upon by planes to reduce it to an uniform thickness, or is the said roller so applied as simply to force the plank against the cutting edges of the planes, without reducing it to an equal and uniform thickness?

6. If in answer to the preceding interrogatory you shall have stated that in the Hill machine the moveable pressure roller is used to force the plank against the cutting edges of the planes, and that it does not act so to control the plank as to enable the planes to reduce the plank to an equal and uniform thickness, please state whether in this it differs from or resembles the Woodworth machine; and if different, whether such difference is a difference in principle or mode of operation, or simply a formal change?

7. State whether you find in the said Hill machine such a combination of the moveable pressure roller and the cutting edges of the planes, that the roller shall act on the plank as it passes through the machine, to keep that face of it which is not to be planed, always against the bed and at the same distance from the point of action of the planes, and thus insure the planing of the plank to an equal and uniform thickness.

8. If you shall have answered the preceding interrogatory in the negative, state whether, in your opinion, such a combination of the moveable pressure roller with the planes, as pointed out in the preceding interrogatory, is or is not the essential principle or character of the Woodworth machine, and whether without such a relation of the pressure roller and planes, a plank can be reduced to an equal and uniform thickness.

9. In the Norcross machine, described and represented in the specification and drawings before referred to, do or not the planing cylinder and bed retain the same distance apart during the planing of a plank, and if yea, state the reason why, and whether this be necessary to reduce a plank to an equal and uniform thickness.

10. State what means are employed in the said Norcross machine to

keep that face of the plank which is not to be planed against the bed, and always at the same distance from the point of action of the planes, and whether such means are substantially the same in principle, or mode of operation, as those employed in the Woodworth machine.

11. In the Norcross machine, before referred to, do or not the planing cylinder and inverted bed move together relatively to the bars on each side of the planing cylinder, whilst in the Woodworth machine the cylinder and bed are stationary, and the pressure rollers move relatively to them? Is this difference a mere reversing of the parts, or does it constitute an essential change in the principle or mode of operation?

12. In your opinion, is the substitution of two bars for rollers an invention, or the mere substitution of an inferior mechanical equivalent?

13. In your opinion, does the Norcross machine, before referred to, involve or cover the principle or mode of operation of the Woodworth planing machine, or is it essentially different?

C. P. & B. R. CURTIS, *for Complainants.*

A true copy. Attest:

EPHM. BROWNE, Jr., *Clerk.*

Cross interrogatories to be proposed to Thomas Blanchard, William R. Lee, Jeremiah Myers, and others, witnesses to be examined in behalf of the plaintiffs.

Defendants take the following exceptions to the direct interrogatories:

The others intended to be examined should be named, but are not.

The third interrogatory requires the witnesses to construe the Woodworth patent, which is for the court.

The fifth interrogatory is objected to as leading, and also the last line of the sixth interrogatory, for the same reason.

The first part of the seventh interrogatory is objected to, as inquiring of the witnesses that which best appears by the Norcross patent, a written document in the case.

The eleventh interrogatory is objected to as leading.

The twelfth interrogatory is objected to as assuming a fact, to wit, that bars are substituted for rollers in the Norcross machine, and the last clause thereof is objected to as leading.

Cross interrogatories.

1. Have you any, and what, practical acquaintance with the construction or use of planing machines?

2. What do you understand by mechanical equivalents?

3. State what are each and all the mechanical equivalents, if any, in the Woodworth and Norcross machines.

4. Can you say that the board while planing is kept to rest bar *f*, in the Norcross machine, by the same or any analogous device, as it is kept to the bed plate in the Woodworth machine?

5. Can you say that the parts B and B of the immoveable platform,

on either side of the cylinder in the Norcross machine, perform the same function, in the same way, as the pressure rollers *f f* on either side of the cylinder in the Woodworth machine?

6. Is not the part B of the immoveable platform in front of the cylinder in the Norcross machine, better to cut against than the pressure roller *f* in front of the cylinder in the Woodworth machine?

7. Could the Norcross machine reduce the board to a uniform thickness without the combination and mechanism mentioned in the first claim in the said Norcross patent? Is said combination and mechanism to be found in the Woodworth machine; if so, point it out?

S. BARTLETT,
J. GILES,
For defendants.

A true copy. Attest.

EPHM. BROWNE, Jr., *Clerk.*

Deposition of Thomas Blanchard.

1. I am sixty-two years of age, and by profession I am a mechanical engineer, and practical and theoretical machinist, and I have been engaged for over forty years in the invention, combination, and arrangement of machinery, studying as well as using mechanical principles, and these have been my practical means for becoming acquainted with machinery and mechanical principles. I consider myself competent to form a judgment between mechanical principles and mere changes of equivalents; when the latter, the substitution of a mechanical equivalent is used instead of a difference of mechanical principle or invention. To this particular subject, I mean such substitution, I have given much attention, and at much cost to myself. As an inventor I have taken out twenty-seven patents, and I have had much litigation bearing on this very matter, of substitution of mechanical equivalents for new mechanical invention using different principles; all this has required from me much attention, and makes me think myself competent as stated. I have been for years examined in court constantly and habitually as an expert, and I am now engaged to give three depositions, each in a different suit, as an expert in mechanical inventions; such applications are made to me with the recurrence of almost every week.

2. I have examined very frequently the specification and letters patent, drawings, &c., referred to; I am perfectly familiar with them; I have testified in relation to them often. I examined them and another patent last evening. I think I understand them as well as I ever can be made to. I have seen the operation of the invention, as described, very many times, and in very many places.

3. In my opinion, the principle or mode of operation of the planing machine of Woodworth, specified in the question, is this, bringing a warped or uneven board by the pressure to be even and flat, while the cutting knife brings the board to a given thickness, the pressure on one side preventing the knife from drawing the board towards it; all this is

combined in one effect, and constituting, what I consider, the characteristic of Woodworth's patent.

4. I have examined the specification and drawings of a machine for planing planks, patented to Nicholas G. Norcross, 12th Feb., 1850; and containing a description of a machine alleged to be invented by one Hill. The difference in principle, between Hill's machine and Woodworth's, I consider to be this: Hill's machine does not reduce the board to a uniform thickness, which is the purpose and effect of Woodworth's machine. Hill's machine only takes a shaving from the board, leaving the inequalities of the board as they were before.

5. In Hill's machine the effect of the roller is only to drive the planks against the cutting edge, and on one side of the cutting cylinder to hold the plank to the bed. It has no effect in reducing the plank to a uniform thickness, because the roller rises and falls with the variations of the thickness of the plank.

6. In Hill's machine the failure of the arrangement to effect the bringing of the plank to a uniform thickness, is a difference between Hill's machine and Woodworth's in principle, and not a mere formal change, because it is a difference in result; Woodworth's machine effecting a purpose which Hill's does not, and cannot.

7. I do not find in Hill's machine any such arrangement. In Woodworth's machine I do find such arrangement.

8. I do consider the combination described to be the essential characteristic of Woodworth's machine, and the difference between that and Hill's machine; and without such a relation of the pressure roller and planes, as that combination gives, I don't know how the plank could be reduced to a uniform thickness.

9. In the said Norcross machine the planing cylinder and bed retain the same distance apart during the planing of a plank; the reason is because the planing cylinder and bed-plate rise and fall together in conformity to the variations in the thickness of the board, and this relation, of the planing cylinder and bed retaining the same distance apart during the planing of a plank, is necessary to reduce a plank to an equal and uniform thickness.

10. In Norcross' machine the face of the plank which is not to be planed is kept against the bed, and at the same distance from the point of action of the planes by a rest attached to the frame that contains the cutting cylinder, acting by the gravity of the rest; and cutting cylinder and sliding frame with additional weights, if such be necessary, to keep the face of the plank down to the bed, both the rest and cutting cylinder rising and falling together according to the variations of the thickness of the plank and being attached to the same sliding frame. And this machine of Norcross I consider the same in principle as Woodworth's, and producing the same effect by a mere transposition of parts, having that below the board which Woodworth's machine has above, and that above the board which Woodworth's machine has below.

11. The operation of the two machines is as stated in the question, and, as I have said before, the difference between them is a mere transposition of parts.

12. The bars in Norcross' machine have the same purpose as the rollers in Woodworth's; they are inferior means to the same effect, making a greater resistance to the advancing of the board. I consider them no invention, but only the substitution of an inferior mechanical equivalent.

13. I consider the Norcross machine to be in principle the same as Woodworth's, producing the same result by substantially the same means; the difference between them being merely in a transposition of parts, and the use of mechanical equivalents inferior in operation.

Answers of said Blanchard to cross interrogatories.

1. I have made a great many planing machines, using the planing cylinder for other purposes than planing boards. I have never used with them the pressure rollers; my practical acquaintance with planing machines began more than twenty years ago, and has continued ever since; at various times during that period I have used them in my own business.

2. By mechanical equivalent, I mean a known mechanical means, used to produce the same result as some other given mechanical means.

3. In the Norcross machine the sliding frame *c d* that contains the rest bar *f*, and cutting cylinder, and all the parts attached to them which compose the sliding frame, and the additional weight that becomes necessary to attach to them for the purpose of keeping the board firm against the platform *b b*, is a mechanical equivalent for the pressure rollers that serve to keep the board firmly against the bed plate in the Woodworth machine.

4. I consider it to be the same device; it is weight or pressure, and nothing more.

5. Exactly the same functions in combination, the difference being only that the part stationary in one is moveable in the other.

6. The part *b* in the Norcross machine as specified in the question is not better to cut against than the pressure rollers of the Woodworth machine, and it makes more friction and requires more power. I have no drawing of the Woodworth machine, and do not certainly know that I understand the reference to *f* in the question.

7. I understand Norcross' first claim to be for a combination of a rotary planing cylinder and rest, specified by him, with any device for bringing the board to a uniform surface; without some such device, it could not of course bring the board to an uniform thickness. In the Woodworth machine there is the same or analogous combination as in Norcross'; for in Woodworth's machine there is the rotary planing cylinder, and the bed plate is the same exactly as Norcross' rest *f*. The words of claim in Woodworth's patent, as to the combination of these, is similar to the words in Norcross' claim.

THOMAS BLANCHARD.

Deposition of William R. Lee.

1. I am forty-two years of age, and by profession a civil engineer.

I pursued the study of mechanics during the last twenty-two years, and during the last sixteen years I have had under my charge a machine shop, and have also been interested as a proprietor in the construction of machinery, and have been constantly in the habit of investigating mechanical principles and combinations developed in the practical operation of machinery; these are the means and opportunities I have had of acquiring the knowledge of mechanical principles referred to in the question. I have been frequently examined in court as an expert in patent causes.

2. I have examined the re-issued letters patent referred to, originally granted to William Woodworth, December 27, 1828, and reissued to W. W. Woodworth, administrator of William Woodworth, July 8, 1845, and I hold now a certified copy of those letters patent, certified by Mr. Ewbank, April 24, 1850. I understand the same. The copy I hold is identified by my name, and this date, March 19, 1851, written by me on the back thereof, and by the name of the commissioner written under mine, and the mark A added.

3. The essential parts of the Woodworth planing machine are, a moveable carriage, feeding rollers, and pressure rollers and cutters, which revolve; which, in their combination, reduce a rough board to a uniform width and thickness; these are the distinctive properties of Woodworth's machine.

4. I have examined the specification and drawings of a machine for planing plank, patented to Nicholas G. Norcross, February 12, 1850, which contained an alleged description of the machine invented by Hill. The Hill and Woodworth machines seek to produce the same effect, and I consider them substantially, or in all their substantial parts, as mechanically identical. The only difference I find in the two machines is the relative position of parts, and the substitution of a solid bench in Mr. Hill's machine for the pressure rollers in Woodworth's.

5. In the specifications and drawings of Hill's or Norcross's machine, the pressure roller only forces the plank against the cutting edges of the planes, without reducing it to an equal and uniform thickness.

6th. In the respect stated in my preceding answer, the Hill machine differs from the Woodworth machine. This difference is a mere change in form, and not a difference in principle.

7. I do not.

8. I consider the combination specified of the moveable pressure roller with the planes the essential principle of the Woodworth machine, without which, or some mechanical equivalent, the reduction of the plank to a uniform thickness cannot be produced.

10. The means used in the Norcross machine for the purpose specified in the question, are a rest bar, (so called,) and are substantially the same as those employed in the Woodworth machine.

11. The relation and motion of the parts specified in the question, of the Norcross machine and the Woodworth, and as specified therein, and the difference in the two machines, is a mere reversing of the parts, and not a difference in principle.

12. It is a substitution of a mere mechanical equivalent, and, I think, inferior.

13. In my opinion, the Norcross machine is essentially the same with the Woodworth machine.

Answers of said W. R. Lee to the cross interrogatories.

1. I never built or used a planing machine for boards; I have used, and for many years, planing machines for iron; these I did not build.

2. I understand by mechanical equivalent, a mechanical device substituted for another, producing the same effect.

3. The bench is common to both, and so are the revolving cutters. The pressure rollers in the Woodworth machine is the equivalent to the rest in the Norcross machine. The feeding rollers are common to both.

4. I think the device in the one machine for the purpose specified, is analogous to the device in the other; that the one is a mechanical equivalent for the other.

5. Yes, I think so.

6. I cannot say which is better, not having actually tried them.

7. The Norcross machine could not produce its effect without the combination and mechanism mentioned in said first claim "or sound analogous device;" and the claim uses the words "analogous device," and so includes such. The Woodworth machine contains a device analogous to that of the Norcross, and it is "pressure rollers."

W. RAYMOND LEE.

Deposition of Jeremiah Myers.

Answers of Jeremiah Myers to the interrogatories to him addressed:-

1. I am forty-seven years of age, and by profession a machinist; I have been a machinist for twelve years, and was previously concerned in building railroad carriages, and before that other carriages; for twenty-five years my business has led me to the study of mechanical principles. As a machinist I have built woollen, cotton, and various other machinery, and I have had charge of large machine shops, making all sorts of machinery. This practice, and the accompanying study it required, are my means for the mechanical knowledge which I think enables me to judge between a principle or mode of operation, and a mere mechanical equivalent. I have never been examined in court as an expert; I have given an affidavit.

2. I have examined the specification and drawings mentioned in the question, and I think I understand them.

3. The principle is the controlling of the board while passing through the machine, reducing the board to a uniform thickness, and tongueing and grooving it, at the same operation.

4. I have examined the specification and drawings referred to in the question, in which there is a description of a machine said to be in-

vented by Hill, and the only thing in the Hill machine which resembles the Woodworth machine is the rolls which carries the board against the cutting edge of the cylinder; its difference is in all other respects, except, of course, a revolving cylinder.

5. In Hill's machine the pressure roller does not control the plank so as to reduce it to an uniform thickness, it merely operates to carry the plank against the cutting edge, smoothing the surface, but leaving the plank as unequal as it was before.

6. Hill's machine in not reducing the plank to an uniform thickness, differs from Woodworth's, and that difference is one of principle, and not a mere formal change or matter.

7. In Hill's machine I do not find the combination specified in the question.

8. The combination referred to I consider essential to the principle, and the essential principle of the Woodworth machine, and without the relation of the roller and planes described, the plank could not be brought to an uniform thickness.

9. In the Norcross machine referred to, the planing cylinder and bed do retain the same distance apart during the planing of a plank; the reason is that the planing cylinder and bed are so bolted that they must keep the same distance apart, and rise and fall together as the plank varies in thickness, and this is necessary as that machine is constructed to the bringing of a plank to a uniform thickness.

10. In Norcross' machine the bed and cylinder are confined in a frame that moves up and down as the boards vary in thickness. The means referred to are a weight attached to the frame in which the cylinder and bed are stationed, and its pressure on the top of the board as it passes over the bar, so that the effect is the result of the joint action of weight and bar. These means are in principle the same as those employed in the Woodworth machine.

11. In the Norcross machine the bed and cylinder move relatively to the bar. In the Woodworth machine the rolls move relatively to the stationary cylinder and bed; what is stationary in one is moveable in the other. This is no difference in principle; Norcross' machine only reverses the positions of parts, and substitutes for a roll, a bar, which is a poor equivalent, and can't be otherwise. A bar necessarily occasions more friction than a roll.

12. It is merely a substitution of a very inferior mechanical equivalent.

13. I think the Norcross machine involves the principle of the Woodworth machine, and borrows from it all its operation, essentially.

Answers to cross interrogatories by said Myers.

1. I have built and repaired planing machines, and before that, and in 1837 and '8; they were built on my premises, and I was well acquainted with them.

2. A bar substituted for a roll is an example of a mechanical equivalent; it is one mechanical means used for another.

3. In the Norcross machine the bar or inverted bed, and the cylinder moving in the frame, are equivalents to the moveable rolls in the Woodworth, and these are the essential equivalents.

3. I say the device is analogous; and in the Norcross machine a mere mechanical equivalent is used.

5. I can and do.

6. No better whatever.

7. It could not be made to reduce the board to a uniform thickness, unless by the combination in the claim; such combination is in the Woodworth machine, and consists of the stationary bed and cylinder, and moveable pressure rolls, corresponding to the moveable bed plate and cylinder in connexion with the stationary bar.

JERE'H MYERS.

Deposition of Harvey Waters.

Answers of Harvey Waters to the interrogatories.

1. I am forty-six years of age, and by profession a machinist. I have been engaged, practically and theoretically, as a machinist thirty years, and much of my time since the age of twenty years has been spent in designing and composing machinery for practical purposes. Since the age of thirty-four I have been much engaged in inventing and constructing machines and in operating the same, having my attention called, in the mean time, to the considering of machinery in its principle and mode of operation, rather than in superficial appearance; and for the last six years more particularly my attention has been frequently called to different patented inventions, regarding them in their relation to the state of the arts at the date of their invention, as well as in their mode of operation; thus endeavoring to find what was really the expense of the subject matter. In pursuing which I have been examined in court, as an expert, in Massachusetts, Connecticut, New York, and Pennsylvania.

2. I have examined such specifications and drawings, and I believe I understand them.

3. The reducing to practice of Woodworth's invention mainly consists in combining and arranging mechanically the following elementary devices, to wit, a feed apparatus and guides, a yielding pressure, (one or more,) a bed piece and cutting instrument, in such manner as that the feed apparatus will receive the planks or board when presented, and carry them through from end to end under the yielding pressure, and between the bed plate and cutting instrument, the guides controlling the direction of the boards edgewise, the yielding pressure (correcting if need be and) holding firmly on the bed piece, the plank or boards in their transit over it and under the cutting instrument, while in its action of removing the surplus material, the finished planks or boards being determined in their thickness by the position and space between the bed plate and the lowest line of cut of the cutting instrument; by this mode of operation common planks or boards, notwithstanding they may be considerably warped and twisted, will be correctly and firmly pre-

sented on the bed piece to the cutting instrument, wherein transit every section will be reduced to a uniform thickness, although the board, when clear of the machine again, will have nearly the same warp and twist that they had before, yet when they come to use for flooring and siding (which is the great want to which this invention is applicable) they are nailed on a substantially level bed, and consequently when so nailed they will present a surface substantially level, and all without the necessity of reducing each plank or board to a plane per se, or in technical phrase, getting them out of wind, to do which would greatly reduce, and, in some cases, entirely annihilate their thickness. Now this facility of making, comparatively, perfect work of very imperfect materials, while the thickness of the finished flooring or ceiling may be equal to the minimum thickness of the boards or planks, I consider the great distinctive pattern of Woodworth's invention, as it is of great utility, and cannot be done by any of the other various inventions which have come to my knowledge, to wit, Bramah's, Bentham's, (and they were many,) Smith's, which was a modification of Bramah's, Muir's, or Hill's.

4. I have examined the specifications and drawings referred to in the question, containing the description of what is alleged to be the invention of one Hill. I find the Hill machine similar to the Woodworth in having a feed apparatus and guides, a yielding pressure, and a cutting instrument; but differing from Woodworth's in having no positive bed piece against which the planks or board are cut, the cutting being done against the pressure roller and spring, which have not a positive relation to the cylinder, but which vary their relation thereto according to the thickness of the plank or board at such section as may for the time being, in its transit, be between the pressure roll[er] and spring, and the pressure-way over which the plank or board slides to arrive at the cutting instrument; the result being to cut away a positive uniform quantity of wood instead of leaving a positive uniform quality, as in the Woodworth machine, the positive relation being maintained between the pressure-way before referred to and the cutting instrument in the Hill machine, instead of between the bed piece and cutting instrument as in Woodworth's, and thus in the Hill machine only smoothing the board, while the proportionate inequalities will be greater than they were before; for if one-eighth of the board be cut away there will still be the same difference of thickness as before, while the thickness to which this difference bears relation will be as seven to eight, and when said plank or boards shall be put to use for flooring or ceiling, as before described, it will be necessary to prepare for every board a separate bed to accommodate these inequalities, which would probably take up more time than to employ the old method of laying down the boards in rough, and then reducing them to a plane by hand dubbing and planing.

5. The moveable pressure roller and spring in said Hill machine force the planks or boards against the cutting edges of the cutting instrument, and also against the sliding way or permanent part of the pressure before referred to, thus tending to correct them if warped; but

the roller spring and sliding way, or permanent side of the pressure, altogether, do not so control the plank or board, while being acted on by the cutting instrument, as to correct in any degree their irregularities of thickness.

6. As far as reducing to dimensions is concerned, the Hill machine is essentially and totally different from the Woodworth machine, which difference I consider a clear and substantial difference of principle or mode of operation.

7. I think this interrogatory is fully replied to in my answers to the fifth and sixth interrogatories. The only rests which are permanent, in their relation to the cutting instrument, are on the same side of the board with the cutting instrument, and therefore cannot determine its thickness.

8. That such a combination of the pressure with the cutting instrument and bed piece as will keep the face, which is not to be planed, of the plank or board against the bed, having a positive relative distance from the lowest cut of the cutting instrument, is the essential principle of Woodworth's invention, is fully set forth in my answer to the second interrogatory, and without such relation between the bed piece and cutting instrument planks and boards cannot be reduced to a uniform thickness by planing one face only.

9. In the Norcross machine, described and represented in the specifications and drawings before referred to, the planing instrument and bed maintain the same relation to each other during the planing of a board, and for the reason that they are positively connected to that when the bed piece (which, in connexion with the pressure bar over which the board passes to arrive at the cutting instrument, and the other pressure bar over which the board passes after leaving the cutting instrument, constitute the pressure) rises in consequence of introducing the plank or board, or any increased thickness thereof, the cutting instrument rises with it, and vice versa; while the positive distance between the bed piece and the lowest line of cut of the cutting instrument, (or, as strictly in this case, the highest line of cut of the cutting instrument, the bed piece and cutting instrument being in position and point of action inverted,) is always the same, which position and uniform distance, as has been repeatedly stated, are necessary to reduce a plank or board to a uniform thickness.

10. The means employed are the pressure bars before referred to, with the weighted pressure bed piece and the cutting instrument thereunto positively connected, in order to maintain the positive relation between the said bed piece and cutting instrument; all of which means, taken together, are substantially the same in principle, or mode of operation, as the means employed in the Woodworth machine for accomplishing the same purpose.

11. In the Norcross machine the cutting instrument and inverted bed do move together relatively to the pressure bars on each side of the cutting instrument; while in the Woodworth machine the cylinder and bed are stationary, and the upper pressure rollers move relatively

to them. The Norcross machine therein being only colorably different from the Woodworth; but in its essential principle, or mode of operation, the same substantially.

12. In this case the substitution of the two pressure bars for the pressure rollers involves no invention, the bars being only inferior mechanical equivalents for the pressure rollers.

13. I believe the essential principle of the Woodworth invention is covered by the Norcross machine.

Answers of said Harvey Waters to cross interrogatories.

1. I never constructed or used a planing machine for practical use. I once constructed and tried a working model planing machine, in order to prove a fact in relation to the practical planing of boards to a court and jury, in Philadelphia, the said model being capable of being colorably transformed into three different planing machines; but, as I believe, substantially, in all its variations, the Woodworth machine.

2. I understand just what the word implies; that which is equivalent to, or performs the functions of, or answers the purpose of another device; always with the qualification that the supplying device must be well known in the arts; if the supplying device involved invention, it might be a mechanical equivalent, and something more.

3. In the Woodworth machine the yielding pressure is made up (firstly) of the feeding and pressure rollers between which the board passes to come to the cutting instrument, and (secondly) by the other pressure and clearing rollers between which the board passes after leaving the cutting instrument, which yielding pressure performs the function of (correcting if need be and) firmly holding each section of the board in transit upon the bed piece, while under the action of the cutting instrument. In the Norcross machine the yielding pressure is made up of (firstly) the stationary pressure bar and the front edge of the yielding bed piece, between which two the board passes to the cutting instrument, and (secondly) the back edge of the said yielding bed piece and the other stationary pressure bar over which the board passes after leaving the cutting instrument. Now this yielding pressure in the Norcross machine, is to my mind equivalent to the yielding pressure in the Woodworth machine. And again, I find the cutting instrument of the Woodworth machine immediately over the bed piece and positively connected with it, the thickness of the board being determined by the positive distance between the lowest line of cut of the cutting instrument and the bed piece. In the Norcross machine I find the same state of things existing, only they are inverted in their position—the effectual relation of the cutting instrument and bed piece, and of both to each side, to wit, the permanent and yielding side of the yielding pressure, being the same in the Norcross as in the Woodworth. I consider the whole of this device equivalent to the corresponding device in Woodworth; in all other respects the essential devices are precisely the same, I believe.

4. Yes, I have just answered that in the affirmative.
5. Yes, substantially the same.
6. I don't see that it is.
7. The Norcross machine could not reduce a plank to uniform thickness without the combination and mechanism mentioned in said first claim. That combination and mechanism I find in the Woodworth machine, and I have specified it in describing those parts of the Woodworth machine which have their equivalents in the Norcross machine, in my answer to the third cross interrogatory.

HARVEY WATERS.

The deposition of William C. Hibbard.

Answers of said Hibbard to the interrogatories.

1. I am thirty-six years of age, and by profession a mechanical engineer. My present business is that of inventing and arranging machinery and superintending the construction of the same, making drawings and specifications for patents, superintending the construction of mills for manufacturing purposes, etc. I have followed the business of constructing machinery from my childhood. I was employed for about nine years as a foreman and draftsman in the engine manufactory of Otis Tufts, of this city. I have been several times examined as an expert in the courts in relation to mechanics and natural sciences. I am often called upon to give opinions in relation to mechanics, and I feel competent to judge of the subjects mentioned in the interrogatory.

2. I have examined what purports to be a certified copy of letters patent, granted to William Woodworth on the 27th day of December, A. D. 1828, and re-issued 8th July, 1845, of the description mentioned in the interrogatory, and that I fully understand the same.

3. The machine is represented in the letters patent in two forms, each form embracing substantially the same mechanical principles. The agents combined to form this machine are, first, a rotating planing cylinder provided with knives or cutters with straight edges, all set with their edges in a common circumference and parallel with its axis; second, a "bed," "bar," or "guide," fixed parallel to the axis of the cylinder and a distance from its circumference equal to the required thickness of the plank to be planed; third, rollers on each side of the planing cylinder and parallel with it, which press firmly on the plank and keep it in contact with the "bed," "bar," or "guide" before mentioned in opposition to the tendency of the planing cylinder to draw the plank towards itself, which rollers are made so as to approach or recede from the "bed," as the varying thickness of the plank shall require; and fourth, feeding rollers or other analogous device for moving the plank longitudinally forward through the machine at a right angle to the axis of the cylinder.

I make no allusion to the other necessary parts of the machine whose functions are merely to preserve those several agents in proper relations to each other.

The plank by the action of the feeding rollers or other analogous device is carried forward longitudinally and passes between the bed on one side, and the planing cylinder and pressure rollers on the other, by which that portion of the thickness of the plank which exceeds the distance of the planing cylinder from the "bed" is removed by the action of the cylinder, the knives or cutters of which move in a direction (while cutting) opposed to the progressive motion of the plank, and of course cut from the planed to the unplaned surface. This action of the knives has a tendency to draw the plank towards the axis of the cylinder, but is counteracted by the action of the pressure rollers upon each side of the same which bear upon the plank and keep it firmly against the "bed" as before described; the pressure roller which bears upon the unplaned surface of the plank moves to and from the "bed" to conform to the inequalities in the thickness of the plank, while the one that bears upon the planed surface remains in a nearly constant position in relation to the "bed" and planing cylinder, because the two surfaces of the board are then parallel.

The principle of the machine, therefore, in my opinion consists in the combination of these four agents so as to plane a plank to an equal and uniform thickness, operating in the manner described.

4. I have examined what purports to be a certified copy of letters patent granted to Nicholas G. Norcross, Feb. 12, 1850, for an improvement upon a planing machine invented by one Daniel Hill. Hill's machine, as therein described, consisted substantially of the following agents, viz., first, a planing cylinder with a single knife or cutter; second, a platform bench with an aperture in it, through which the planing cylinder projected a sufficient distance to cut away any required thickness from the surface of the plank or board subjected to its action, the relation of the cylinder to the bench was constant; third, a spring plate which bore upon the plank nearly opposite to the cylinder and forced it toward the cylinder and bench; and fourth, feeding rollers to carry the plank forward as in the Woodworth machine.

It differs from the Woodworth machine in this, viz., that by its action a stratum of uniform thickness was removed from the surface of the plank leaving the inequalities in thickness as before. While Woodworth's machine removes all that portion of the plank which exceeds the thickness required, rendering the opposite sides of the plank parallel. And the arrangement of the parts of the two machines are made to correspond to these separate results; thus the planing cylinder and bed in the Woodworth machine are fixed in constant relations to each other upon opposite sides of the plank, the distance between them determines the thickness of the plank, and all excess above that thickness is removed. In Hill's machine the cylinder and bench are also fixed in constant relation to each other, but are upon the same side of the plank, and the distance that the cylinder projects beyond the bench determines the thickness of the stratum to be removed. Woodworth's is a completely organized machine, while Hill's machine as described in the patent does not seem capable of properly fulfilling the purpose for which it was designed.

5. There is no provision whatever in the Hill machine for reducing planks to an uniform thickness, and therefore no part of the machine can act to produce such a result. The only device in that machine which seems to perform the functions of a pressure roller, is the spring plate marked R, in figure 2 (two) of the drawings, which may perhaps be assisted to some extent by the feed roll marked G in the same figure; these act merely to press the plank against the planing cylinder and bench to enable the cylinder to remove a stratum of certain thickness from its surface, leaving the plank as unequal in thickness as before.

6. In relation to the properties described in the last preceding answer, the Hill machine does not resemble the Woodworth machine. I consider the difference to be one of principle and mode of operation, and to produce different and distinct mechanical results.

7. I do not.

8. I do consider the combination of the moveable pressure rollers with the planing cylinder and bed, fixed in relation to each other, as pointed out in the seventh interrogatory, to be the essential principle or character of the Woodworth machine, and without such a relation of these parts I cannot conceive how a plank can be reduced to a uniform thickness by it.

9. If that part of the Norcross machine which he calls the "platform" or "bed," and is marked B in the drawings, is what is referred to in the interrogatory as the "bed," I answer that they do not retain the same distance apart during the planing of a plank; for that distance depends upon the thickness of that portion of the plank which is to be removed, to reduce it to a uniform thickness, and will vary as that varies. To accommodate this change of position the frame in which the cylinder is supported is made to rise and fall. But if by the "bed" is meant that part of the Norcross machine which is marked *f* in the drawings, against which that face of the plank rests which is not to be planed, and which I conceive to be the equivalent of the "bed" in the Woodworth machine, I answer that they do retain the same distance apart during the planing of a plank, because they are both fixed in the same frame. They must retain that uniform relation to each other, in order to reduce a plank to a uniform thickness, as the thickness is determined by the distance between them.

10. The face of the plank not to be planed is kept against the "bed" or rest bar *f* by the weight of the frame, which carries the said "bed" and planing cylinder. This "bed" bears directly upon the plank, while the plank rests upon the bar marked B in the drawings; but in order to show more clearly the relation between the two machines and their mode of operation, I think it proper to state at this time that the Norcross machine appears to me to be composed essentially of the same mechanical agents or their equivalents, that go to make up the Woodworth machine, as described in my third direct answer, and to be arranged in precisely the same relation to each other, and to perform precisely the same functions, and are simply inverted in their position, and in the order of some of their movements; thus, those parts

which in one machine are uppermost, in the other are beneath, and those parts which are fixed in one are moveable in the other, and vice versa. If we should invert the Norcross machine and let the "rest" or bed *f* and planing cylinder remain fixed while the other parts of the machine were allowed to rise and fall to conform to the varying thickness of the plank to be planed, we should then have these several agents performing their functions in precisely the same order as in the Woodworth machine; thus the cylinder and "bed" would remain at a fixed distance from each other to determine the thickness of the plank—the plank would be pressed against the bed, and from the planing cylinder by the action of the bar B, which, thus rendered moveable, occupies the place and performs the functions of the pressure roller in the Woodworth machine. The bar *y* also stands in the same relation and performs the same function as the other pressure roller in the Woodworth machine. The bar B' in Norcross' machine, in my opinion, is no part of the combination, and exerts no action whatever, in the process of planing; I therefore think that the two machines are identical in principle and mode of operation, so far as relates to the operation of planing. There are some other devices which are appended to the Norcross machine, namely, a conductor to carry away the chips from the planing cylinder, and also a provision for bending the plank in the direction of its length, so as to present an interior curved surface to the action of the planing cylinder, which are not to be found in the Woodworth patent; but both of which, to my certain knowledge, were used in connexion with the Woodworth machine long prior to the patent of Norcross.

11. In the Norcross machine, and in the Woodworth machine, the several parts mentioned do have the respective movements inquired of in the interrogatory; and such inversion of the order of parts does not, in my opinion, constitute an essential change in the principle and mode of operation, as I have already stated in my next preceding answer.

12. In my opinion, the substitution of two pressure bars for two pressure rollers does not require invention, as such substitutions are matters of every day occurrence, and that, for the purpose to which they are applied in the machine, they are inferior to the rollers, as they produce a greater friction, and will sooner be rendered imperfect from wearing.

13. In my opinion, the Norcross machine does cover the principle and mode of operation of the Woodworth machine; the differences are those of form or addition, as I have already stated in my 10th answer.

Answers of said Hibbard to the cross interrogatories.

1. I have worked at repairing a Woodworth planing machine, and a few years since I had occasion to get up a new design for a planing machine, on the general principle of Woodworth's machine; in doing

which I had occasion to examine the construction and operation of the Woodworth machine thoroughly.

2. When two mechanical devices, though differing in form or other properties, will each produce the same mechanical result, and may be substituted the one for the other, they are mechanical equivalents.

3. I consider the planing cylinder and bar *f*, as combined in the Norcross machine, as the equivalent of the planing cylinder and bed of the Woodworth machine. I also consider the bar marked B, in the Norcross machine, as the equivalent of the pressure roller, which bears upon the unplaned surface of the plank in the Woodworth machine. I also consider the bar marked *y* in the Norcross machine, as the equivalent of the pressure roller of the Woodworth machine, which bears upon the planed surface of the plank; the feeding rollers I consider identical.

4. I certainly do consider the devices by which the board, while planing, is kept to the rest bar *f* in the Norcross machine, as analogous to the device by which the board is kept to the bed plate in the Woodworth machine; and to make myself fully understood, I will say in explanation, that when mechanical devices are combined and arranged to produce an organized machine, each device is designed to perform some particular function, and any other device which will perform the same function in its place, in that case, is its equivalent; in this case the function which each device performs is to hold the board firmly in contact with the bed; thus the roller in the Woodworth machine may be substituted for the bar B in the Norcross machine, and the bar B be substituted for the pressure roller in the Woodworth machine, and the machines still perform their appropriate functions. In other combinations, and for the performance of other functions, the roller and bar might not be equivalents; but in this case, in my opinion, they are.

5. That part of the platform, or bed, as it is called, which is marked B^1 in the drawings of Norcross' machine, does not perform the same function as the pressure roller marked *f*, which occupies a corresponding position in the Woodworth machine, because, as I consider, it exerts no action whatever in the process of planing, as I have already stated. That part of the bed or platform marked B in the drawing, I think, performs the same function in substantially the same way as the pressure roller in the corresponding position in the Woodworth machine, as I have already stated.

6. As to the practical working of the Norcross machine in that respect, I am unable to state, having never seen one in operation; but judging from the drawing, and so far as the operation of cutting merely is concerned, I think in cutting cross-grained wood, perhaps it might prevent the surface from being torn by the action of the cutter, because it is formed so as to bear upon the board a little nearer the point of action of the cutters than with the rollers; but I have never heard that the pressure rollers, as arranged in the Woodworth machine, were inefficient for that purpose.

7. To the first part of the interrogatory, I answer it could not. To

the last part, I answer that, in my opinion, the combination and mechanism of the Norcross machine are substantially to be found in the Woodworth machine, as I have already described in my answer to the tenth direct interrogatory, and in my other answers, to which I refer.

WILLIAM C. HIBBARD.

Deposition of William Boardman.

Answers of William Boardman to the interrogatories annexed.

1. I am sixty-three years of age; I am a mechanical and civil engineer, and have been for forty years. I have been employed for forty years in constructing and planning machinery and mechanical works, and the theory and practice have been my study and business, and especially the practice; and I believe I am capable of judging of the difference between mechanical principles and mechanical equivalents. I have been examined as an expert in court in patent causes.

2. I have examined and understand the letters patent, drawings, and specifications referred to.

3. The principle involved, as I understand it, is the revolving cutter in connexion with knives attached, as set forth in the specifications, in connexion with the pressure rollers and bed piece, over which the board is made to pass while being planed.

4. I have examined the letters patent to Mr. Norcross, and the machine, specifications, and drawings, as set forth in a pamphlet published by Mr. Norcross, which are referred to in the question. As between Hill's machine and Woodworth's machine I do not conceive there is any material difference in principle, except in the position of the bed piece; in the Hill machine there is no bed piece to sustain the board in contiguity or contact with the cutter.

5. The rollers are applied in Hill's machine for the purpose of forcing the board into the machine, and also, to a certain extent, to hold the board in a position while being planed, but not so firmly as would be likely to procure a uniform thickness, for the pressure rollers and back bar are so far distant that they can't produce that effect easily.

6. In the point referred to, the production of a uniform thickness, the Hill machine differs essentially from the Woodworth machine, and the difference I consider one of principle and of construction both, because the Hill machine has no bed piece or pressure rollers arranged as in the Woodworth machine.

7. I do not find in the Hill machine the combination specified in the interrogatory.

8. The combination referred to is the essential principle of the Woodworth machine, and without some such combination its effect could not be produced.

9. In the Norcross machine the planes and bed maintain the same distance apart, because they are fixed permanently each in its place in an iron frame, and it is necessary in this machine to have the bed and knives permanent to bring the planks to a uniform thickness.

10. The upper and two lower bed pieces are the only means used in the Norcross machine for the purpose stated, and I consider these means the same in principle as the pressure bar in the Woodworth machine, the feed rollers being the same in both machines.

11. The difference is as stated; and, in my opinion, is a reversal of parts, without any change of principle.

12. I think it merely the substitution of a very inferior mechanical equivalent, greatly increasing friction.

13. In the mechanical principle I consider the machines essentially the same, and that the difference between them is in the arrangement of their parts.

Cross interrogatories.

Answers of said William Boardman to cross interrogatories.

1. I have constructed one planing machine, and seen many constructed, and have thus a practical acquaintance with their construction.

2. The substitution of one mechanical means for another to produce the same effect.

3. The pressure bar, in Norcross' machine, is the equivalent for the pressure roller in the Woodworth. The rising of the frame in the Norcross machine according to the inequalities of the plank is the equivalent of the rising of the pressure rollers in the Woodworth machine. In the Norcross machine the effect of the forward pressure bar in preventing the board being drawn on to the cutter is the equivalent for the same effect by the pressure rollers in the Woodworth machine. The remaining parts of the machine are very similar.

4. It is so, as I have stated; the device is analogous.

5. Yes, I consider that they do.

6. I should think it better to cut against, but the pressure rollers answer equally the same purpose, with much less friction.

7. The Norcross machine could produce its effect by the introduction of the Woodworth pressure rollers, and allowing the sliding frame to remain at rest. The principle in the Norcross machine, as specified, is in the Woodworth, but the combination of mechanism in the Norcross machine is not in the Woodworth machine. The mechanical arrangement is varied, and that is what I understand by combination and mechanism.

WM. BOARDMAN.

The United States Patent office, to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy of pages 207, 208, 209, 210, and 211, of volume 23, and of figures 1, 2, 3, and 4, of

plate 27, and figures 5, 6, 7, 8, 9, 10, and 11, of plate 28, of same volume of Brevets d'Invention.

In testimony whereof, I, , commissioner of patents, have caused the seal of the Patent office to be hereunto affixed this day of , in the year of our Lord one thousand eight hundred and forty- , and of the independence of the United States the seventy-

[Seal.] THOS. EWBANK.

2079.

15 Mars, 1817.

BREVET D'INVENTION DE QUINZE ANS.

Pour une machine propre à raboter les bois de toute nature et de toutes dimensions, et à pratiquer sur cette substance, des rainures, des languettes, et des mouloures.

Au Sieur Roguin (Louis-Victor-Joseph-Marc,) à Paris.

L'objet de cette invention est de réduire de beaucoup la main-d'œuvre dans la préparation des bois pris à l'etat de madriers et de planches, afin d'etendre les usages de cette substance.

Le travail du bois, quelque soit l'usage auquel on le destine, peut se réduire à quatre opérations principales, qui sont:

1o. Raboter;
2o. Faire les rainures et les languettes pour joindre les bois;
3o. Faire les moulures qui servent d'ornemens;
4o. Faire les tenons et les mortaises pour assembler l'ouvrage;

Cette dernière operation n'est pas susceptible d'être faite par une machine, puisque la place des tenons et des mortaises dépend de la longueur des bois d'assemblage, et que cette longueur est soumise elle-même oux dimensions de tout l'ouvrage; mais les trois premières operations peuvent être faites et sont réellement exécuté par la machine.

DESCRIPTION DE CETTE MACHINE.

Pl. 27e., fig. 1re., Elévation de côté.

Fig. 2e., Plan.

Cette machine est formée d'un établi composé de deux parties, l'une *a*, qui est fixe, et l'autre *b*, qui est mobile, et quón appelle *le chariot*. Le chariot, porte sur six rulettes, et que la fig 3e represente en particulier de côté, roule sur une partie saillante *c*, appelée *corniche;* il est muni d'un fond mobile qui, au moyen de vis de rappel placées de haut en bas dans l'épaisseur des bois qui forme l'assemblage du chariot, est élevé ou abaissé selon que l'exige la plus ou moins grande épaisseur du bois soumis à l'action de la machine.

Ce chariot est tiré par un treuil *d*, dont l'axe porte à son extrémité, une roue dentée *e*, dans laquelle engrène un pignon *f*, dont l'axe reçoit une manivelle *g*.

10. The upper and two lower bed pieces are the only means used in the Norcross machine for the purpose stated, and I consider these means the same in principle as the pressure bar in the Woodworth machine, the feed rollers being the same in both machines.

11. The difference is as stated; and, in my opinion, is a reversal of parts, without any change of principle.

12. I think it merely the substitution of a very inferior mechanical equivalent, greatly increasing friction.

13. In the mechanical principle I consider the machines essentially the same, and that the difference between them is in the arrangement of their parts.

Cross interrogatories.

Answers of said William Boardman to cross interrogatories.

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WM. BOARDMAN.

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plate 27, and figures 5, 6, 7, 8, 9, 10, and 11, of plate 28, of same volume of Brevets d'Invention.

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Ce chariot est tiré par un treuil *d*, dont l'axe porte à son extrémité, une roue dentée *e*, dans laquelle engrène un pignon *f*, dont l'axe reçoit une manivelle *g*.

Sur la partie fixe a de l'etabli, est placé horizontalment un arbre en fer *h*, représenté en particulier par la fig. 4e., dont les tourillons tournent entre des conissinets de cuivre logés dans des supports en fer *i;* ce même arbre porte un pignon *k*, avec lequel engrène une grande roue *l*, qui reçoit l'action d'une manivelle *m;* il porte aussi les rabots, qui sont cylindriques et dont le diamètre et l'épaisseur dépendent de l'effet qu'ils doivent produire. Les lames dont ces cylindres sont garnis sont prises dans l'épaisseur du fer; elles sont taillées obliquement. Au milieu du cylindre est un trou carré dans lequel entre l'arbre; les outiles sont fixés sur cet arbre par des goupilles.

n, Rabot uniquement destiné à raboter le bois.

o, Rabot-bouvet faisant une rainure.

p, Assemblage de deux rabots-bouvets, laissant entr'eux l'intervalle d'une languette.

q, Assemblage de trois rabots formant une moulure présentant une doucine entre deux carrés.

r, fig. 2e., Planche posée à plat sur le chariot, et sur le bord de laquelle le rabot *q* fait une moulure.

s, Planche posée de champ sur le chariot, et sur laquelle le rabot *o* pratique une rainure.

t, Planche posée également de champ sur le chariot, et sur laquelle le rabot *p* pratique une languette.

u, Cordes à l'aide desquelles le treuil *d* fait marcher le chariot.

v, Châssis en bois adapté à l'établi, et servant à porter l'axe de la roue *l* et l'une des extrémités de l'arbre *h*.

x, Traversé en bois nommé *la guide*.

y, Petet bras courbe qui support le pignon *f*.

JEU DE CETTE MACHINE.

Si le chariot tiré par le treuil parcourt, je suppose, cinq millimetres en une seconde, le rabot porté par l'arbre *h*, que met en mouvement la roue *l*, fait pendent le même temps, dix révolutions sur lui-même (les dents du pignon *k* sont a celles de la roue *l* comme une est à dix) or, ce rabot étant armé de dix-huit lames, il résulte des movemens combinés de l'outil et du bois soumis à son action, que cent quatre-vingts lames agissent successivement sur une longueur de cinq millimétres de bois qui, à raisson du mouvement lent, régulier et progressif, du chariot sur lequel il est placé, presente successivement à chaque lame une nouvelle parcelle de bois, à enlever.

Dans la machine d'essai dont on vient de voir l'explication, l'action est imprimée à bras d'hommes, et au perd en temps ce que l'on gagne en force; mais dans une machine établie en grand, il eu serait autrement. La force motrice sera un manége ou une machine à vapeur; alors, les autils, pouvant avoir un plus grand diametre, pourront avoir plus de lames, et maitre de la force à donner au moteur, ou pourra, en accélérant le mouvement de rotation des outils, accélérer en proportion le mouvement progressif du chariot.

Le retour du chariot, par l'un des moyens que fournit la mécanique pour change le mouvement circulaire continu en mouvement rectiligne alternatif, ferait perdre un temps considerable, puisque le temps employé au retour du chariot devrait être égal à celui qu'il aurait mis a aller; je me propose d'utiliser ce retour dans l'emploi de la machine en grand, et de ne perdre, au moyen d'une suspension de movement, que le temps nécessaire pour retourner ou changer le bois.

A cet effet, un second arbre sera placé après le premier; il portera à son extrémité, une roue de même dimension que le pignon du premiere, laquelle roue, engrenant dans ce pignon, tournera et fera tourner le second arbre en sens contraire du premier; pour que les outils portès par le second arbre n'arrêtent pas le bois dans son premier mouvement *à aller*, ce second arbre sera porte par des supports à charmere, de maniere à pouvoir être levé et baissé à volanté.

Par ce moyen fort simple, les deux mouvemens de va-et-vient du chariot sont utilises, et il n'y a, comme je l'ai déjà dit, de perdu que le temps nécessaire pour retourner ou changer le bois.

Brevet de perfectionement et d'addition, du 30 *Mars*, 1818.

Délivré au Sieur Roguin (Louis-Antoine-Gabriel,) cessionaire du Sieur Roguin, (Louis-Victor-Joseph-Marc.)

Description d'une machine dans le genre de la précédente mais établie en grand.

Pl. 28, fig. 5e. Elévation latérale de cette machine.

Fig. 6e. Plan.

Dans la machine précédente, l'outil est fixe et le bois avance sous cet outil; dans la nouvelle machine, au contraire, l'util a deux mouvemens, l'un de rotation, l'autre de progression.

Dans la premiere machine, l'outil etait un manchon de fer, dans l'epaisseur duquel les lames étaient prises; dans l'outil de la nouvelle machine, que l'on voit en coupe de profil, fig. 7e., on a substituté au manchon du premier outil, un noyau *a* en fonte sur lequel des lames mobiles servant à corroyer et à rainer, et que l'on voit aux figures de détails sous les lettres *b*, *c*, sont tenues dans une màchoire dont la partie inférieure est fixe et appartient au noyau; la partie superieure *d* (voyez les détails) est mobile, les lames sont serrées entre deux máchoires par les vis de pression, *e*, que l'on voit, fig. 7e., sur la partie mobile de la máchoire. Sur la partie inferieure de cette máchoire, sont fixées de petites lames d'acier qui font l'office du second fer des rabots à deux fers.

Cet outil est porté par un chariot *f*, fig. 6e., en fonte à la partie postérieure duquel est fixé un essien en fer *g*, portant deux pignons en cuivre *h*, qui engrément avec une crémaillère *i*, et qui servent à régulaiser le movement du chariot.

La table *k* sement verticalement au moyen des vis que l'on voit en *l*, dans la fig. 8e., que représente une coupe transversale de la machine, faite suivant la ligne ponctuée A B, fig. 6e.; ces vis supportent,

levent abaissent la table selon le besoin et l'epaisseur du bois soumis au travail de la machine. Quatre petites plaques de métal graduées sont placées aux angles intérieurs du bâtis, et servent du regulateur pour mettre cette table dans une position parfaitement horizontale.

m, Deux equerres en fer servant à maintenir la table aux deux extremités, et à l'empêcher de vibrer dans la mouvement de la machine.

Le chariot *f*, que la fig. 9e. represente en elevation, est en fonte et pese, y compris l'outil qu'il porte, environ cent dix kilogrammes; il est necessaire que ce chariot ait un poids suffisant pour n'être pas souleve par l'effort que fait l'outil sur le bois, effort cependant beaucoup moins considerable ici que dans la premiere machine, puisque dans celle-ci l'outil etait perpendiculaire à l'axe, tandis que le biseau du nouvel outil est presque tangent à la circonference.

n. Poulie recevant le mouvement du moteur; ella entraîne la grande poulie *o* sur laquelle elle est fixée: celle-ci communique le movement à l'outil par l'intermediaire de la polie *p* à deux gorges, qui correspond à la poulie *q* de renvoi.

r. Axe des poulies *n*, *o*, portant à l'une de ses extremities, un pignon en cuivre *s* engrenant avec une roue *l*, portant, à son centre, une poulie qui, à l'aide d'une corde et d'une autre poulie *u*, montée sur le bout de l'arbre *g*, imprime le mouvement au chariot; la corde qui passe sur les poulies revient sur une poulie de renvoi, *v*.

La partie posterieure de la table *k* porte un crotchet *x*, contre lequel les pieces de bois *z* viennent, buter et s'arrêter, comme sur les etablis de menuisier; ce même bois est arrêté à l'autre extremite par des griffes mobiles *y*, qui passent sous une bride a^1 que traversent des vis de pression *b*. Les fig. 10e. et 11e. montrent, de face et par dessus, cette bride munie de ces vis.

La fig. 12e. montre en elevation, une des cremailleres *i*, ajustée sur le batis c^1 de la machine, et dans laquelle engrene un des deux pignons, *h*.

Le chariot est ramené rapidement à son point de depart au moyen d'une roue à rochet *d*, armée d'un cliquet, ayant même centre que la roue dentée *l*, fig. 5e. et 6e.

Le guide represente dans la premiere machine par la lettre *x* est, dans la nouvelle machine, porte par le chariot.

Les lettres e^1, f^1, dans les figures de detail, representent l'une un fer à languettes, et l'autre un fer à moulure.

Exhibit D.

The United States Patent office, to all persons to whom these presents shall come, greeting:

This is to certify, that the annexed is a true copy of pages 111, 112, 113, 114, and 115, of vol. 41, and of figures 1, 2, 3, and 4, on the left side of plate 12, of the same volume of Brevets d' Inventions, in the library of this office.

In testimony whereof, I , commissioner of patents, have caused the seal of the Patent office to be hereunto affixed this day of , in the year of our [SEAL.] Lord one thousand eight hundred and forty- , and of the independence of the United States the seventy- .

THOMAS EWBANK.

4244.

9 Mars, 1825.

Brevet d' invention de quinze ans, au Sieur de Manneville (Léonore Thomas,) à Saint Quentin.

Pour deux machines ayant pour objet de bouveter, de blanchir et de réduire à egale épaisseur les bois destinés à faire des parquets aussi bien que toutes de planches, quelle que soit leur dimension.

Par la machine à bouveter, fig. 1e. à 4e. pl. 12e. les deux jointures, la languette et la rainure se font tout à la fois.

Le côté de la languette se fait au moyen de cinq scies circulaires, dont trois *a*, *b*, *c*, sont montées chacune sur un axe placé horizontalement, et les deux autres *d*, *e*, tourne horizontalement sur un seul et même axe placé verticalement.

L'office de la scie *a* fig. 1re, est de joindre la languette *o;*

Celui de la scie *b* est de fendre la planche en dessous jusqu'à la profondeur de la languette *o* seulement.

Celui de la scie *c* est de fendre la planche en dessous jusqu'à la profondeur de la languette *o* seulement;

Et celui des scies *d* et *e* est d'isoler la languette *o* du bois qui lui était attaché tant dessous que dessous, en coupant horizontalement la planche jusqu'à ce qu'elles atteignent les entrailles faites par les scies *b* et *c* qui précédent.

L'office de la fourchette *f* est à la fois des déplacer les deux petites tringles *k*, *l*, qui, par l'opération décrite, ont été détachées du dessus et du dessous de la languette, et d'enlever les deux vivesâretes de la dite languette, afin de faciliter l'introduction de celle-ci dans la rainure *m* qui vient de se former en même temps, et que je vais décrire.

On remarque que, par ce procéde, il n'y a pour ainsi dire aucune perte de bois, et que les deux côtés de la rainure que les mennisiers, avec les outils ordinaires, réduise péniblement et longuement en volets presque de mille valeur, forment, par le nouveau procédé, autant de petites règles ou tringles qui peuvent être utilement employées à divers ouvrages.

La fig. 2e présente l'opération de la rainure *m*. La scie *g*, montée sur l'axe de la scie parallèle *a*, faite, comme celle-ci, l'office de joindre, et les deux scies *h* et *j*, tournant horizontalement ensemble sur un axe vertical, fendent parallèlement la planche, précisement à la profondeur que doit avoir la rainure *m*, calculée pour recevoir une languette semblable à celle ci-dessus décrite.

Puis celle rainure est évidée par un bouvet armé de plusieurs fers

échelonnés et mordant graduellement, lequel reçoit du moteur commun à toute l'opération un mouvement précipité en avant rétrograde.

A l'un de ces ferrements ou adapte un petit outil en forme de tire point, dont l'office est d'enlever la vive-arête des deux côtés de la rainure.

Pour le même but, je me sers également quelque fois d'un porte-outil *n* monté sur un axe vertical. Ce porte-outil est armé de plusieurs ferrements resemblant assez à ceux des bouvets, à l'exception qu'ils se présentant alternativement en sens inverse et obliquement à la rencontre du bois qu'ils enlève nettement.

La planche qu'on vent bouveter est préalablement bien assujettie sur un chariot marchant entre des conducteurs qui ne lui permettent de variation en aucun sens, et qui apporte le bois au travail conformément à la volonte de celui qui opère.

Pour remédier à ce que la planche puisse se présenter aux outils avec la moindre courbare, je me sers d'une pesée dont le poids pose, par une roulette, sur la planche à l'endroit où elle va commencer à être entaillée ; ou peut, par un mouvement du pied ou autre, accroitre ou diminuer le poids, en faisant glisser le poids de droite à gauche ou de gauche à droite, suivant le besoin. Cette pesée resemble assez à un ancienne romaine, sur laquelle le même poids sert, par un mouvement en avant ou rétrogade, à reconnoitre la pasanteur d'un objet quelconque, avec la simple différence pourtant que le support y est place entre le poids et l'object à peser, tandis qu'ici levier est fixé derriére, et que c'est la roulette qui forme le point d'appui. On peut egalement faire l'application de tout autre système de pesée ; moi-même j'en ai employé un autre à l'une de mes tables, où j'ai renfermé tout le mécanisme dans un cylindre de 18 pouces seulement, au moyen de deux ouvertures d'environ 2 pouces de hauteur de chaque côté du cylindre ; le bois entre brut et sort perfectionné du cylindre, dans lequel sont concentres tous les ustensiles du travail, et que personne ne voit : un jour est reservé en dessous pour laisser échapper la moulure que produisent les scies circulaires.

On obtient par la même machine sur les bruts des planches la même opération qui vient d'être décrite pour les côtés, quelle que soit la fausse équerre que l'on désire donner aux pièces : tout le secret alors consiste dans la direction à donnez au chariot qui apporte le bois à la rencontre des outils.

Je crois inutile de décrire minutieusement la charpente sur laquelle sont etablis les ustensiles, l'espèce, la pose et la dimension des divers rouages, parce que c'est au constructeur à calculer les mouvements qui doivent produire les effêts demandés, et à prevenir que l'action de quelque partie ne s'oppose au jeu d'une autre.

Il est inutile de dire après le titre de cette description, que tout doit y être calculé pour qu'avec le même machine ou puisse également bouveter des planches de touts largeurs, épaisseurs, et longueurs. Ainsi les scies, les bouvets ou porte-outils, etc., dorient necessairement s'ecarter, se rapprocher, se lever, se baisser, et les scies *b*, *c*, s'obliquer en sens inverse, suivant le besoin.

La machine de mon invention que je décris reunit tous ces avantages, et peut facilement, servie par un seul homme qui aura les bois à sa proximite operer en douze heures sur deux à trois mille pieds de planches.

Pour planchir, ou reduire d'epaisseur une planche quelconque. (1)

On la présente à champ sur des roulettes dont les axes sont places horizontalement.

Deux cylindres canneles, placès verticalement et parallelement entre eux, pressent la planche des deux côtés. Les fontaines de l'un sont fixés; celles de l'autre sont mobiles dans des coulisses pour repondre à la variation des epaisseurs des bois qu'on vent blanchir. L'effet d'un ressort ou d'un poids sur les derrières-fontaines determine une pression egale et constante des cylindres contre la planche.

Deux porte-outils armes de planes à deux fers, obliquement poses et en sens inverse, sont mus en avant et en arrière par un double vilebrequin, sur lequel est fixée à l'une des extrémités la roue motrice.

L'un de ces porte-outils (qui font un mouvement précipité en avant et rétrograde) ne doit pas plus monter ou descendre que s' écarter ou s'approcher de la planche ; c'est celle-ci qui vient le chercher, tandis qu'au contraire l'autre s'écarte et se rapproche au besoin.

Lorsque la planche se trouve atteinte et réduite à l'épaisseur vouloue, le porte-outil rencontre des roulettes sur lesquelles il frotte, et qui empêchent les ferrements de mordre plus avant dans la planche. Les roulettes doivent être montées de manière à pauvoir s'avancer ou se reculer, puisque c'est de leur écartement que depend l'epaisseur qu'auront les bois, des ressorts ou des poids amènent graduellement le porte-outil à la rencontre de la planche.

Outre le deux cylindres dont il vient d'être parlé, il y en a deux autres, à l'extrémités des châssis, également placés verticalement; mais ils sont fixés dans leur fontaines, parce que, lorsque la planche leur arrive, elle a subi toute son opération ; elle est alors réduite à l'epaisseur voulue, et n'a besoin de ces derniers cylindres que pour deriger sa sortie après qu'elle a quitté les cylindres introducteurs.

Tous les cylindres porte en tête chacun une roue, dont le diamètre doit être calculé sur l'épaisseur du bois qu'on travaille ; les deux premières engrènent ensemble, et les deux dernièrs de même.

Au-dessus de chacune des roues est placée soit une roue dentée pour une chaîne à la Vaucanson, ou bien un triple vilebrequin, qui servent, au moyen d'une vrille, á faire mouvoir à la main les quatre cylindres ensemble. Ce sont les deux premiers qui conduisent la planche au travail.

28 Avril, 1825.

Brevet d'addition et de perfectionnement.

Dans la description de mes moyens d'exécution déposée à Paris au

(1.) Le dessin de cette machine n'etant pas joint au dossier, on ne peut en donner qu'une explication.

secrétariat du département, le 18 Décembre, 1824, où je crains de n'avoir pas été assez explicite, j'ai dit: "La planche qu'on vent bouveter est préalablement bien assujettie sur un chariot marchant entre des conducteurs qui ne lui permettent de variation en aucun sens, et qui apporte le bois au travail, conformément à la volonté de celui qui opère." Alors j'entendais parler d'un chariot (conduisant le bois au travers du cylindre) q'on était obligé, après en avoir détaché le bois ouvragé, de ramener chaque fois à sa première position pour y recevoir de noveau du bois à ouvrager, ce qui occasionait nécessairement un perte de temps qu'il est intéressant de prévenir.

Ce système, auquel je ne renonce pourtant pas pour certains ouvrages, avait l'inconvénient d'obliger l'ouvrier, à chaque pièce de bois qu'il bouvetait, de se déplacer deux fois: d'abord il lui fallait fixer sa pièce sur le chariot en avant du cylindre; puis aller en arrière de celui-ci, détacher la pièce ouvragée du chariot, et revenir ensuite au devant pour ramener le chariot à sa première position, afin d'y recevoir du noveau bois. Cette manière d'opérer condamnait l'ouvrier à une action perpétuelle, le fatiguait et lui occasionnait une perte de temps considérable. Pour remedier à cela, il aurait fallu deux ouvriers au lieu d'un, l'un en avant, l'autre en arrière du cylindre; d' où il serait résulté un accroissement dans les frais de main-dœuvre de cent pour cent.

J'ai maintenant trouvé un moyen qui dispense de toute opération en arrière du cylindre, économise beaucoup de temps et simplifie infiniment l'operation. Voici en quoi consiste ce perfectionnement.

Le conducteur, qui d'abord etait d'une pièce comme presque tous les conducteurs, est formé aujord'hui de nombre de petites parties de 2, 4 ou 6 pouces de long plus ou moins jointes par des charnières, et formant alors un tout parfaitment égal de largeur et épaisseur. Chacune de ces divisions porte un crämaillière et aussi un ou deux trous carrés plus larges en dessous qu'en dessus, dans lesquels se trouvent logées les têtes des boulons qui serrent les valets. C'est en réunissant cette partie separée que je compose un espèce de chaîne qui, étant parfaitement contenue dans sa marche entre des guides bien appropriés, forme mon nouveau chariot. Lorsque ce chariot a traversé le cylindre, et que, par conséquent, le bois a subi son opération et se ploie par l'effet de son propre poids, et se trouve, par le seul jeu des charnières, dégagé de dessous les valets, il tombe à terre, et chaque maillon, reployé en dessous de la mécanique, vient alternativement reprendre sa première place au devant du cylindre pour y recevoir de nouveau bois de la main de l'ouvrier, dont l'unique occupation aujourd'hui est de placer constamment du bois neuf sous les valets, tandis que le bouveteur travaille activement et à lui seul les joints, la languette, la rainure, et se débarrasse du bois à mesure qu'il est ouvragé.

Je crois utile d' expliquer que l'un de mes moyens de pression employés sur le bois dont j'ai entendu parler dans ma description du 18 Décembre dernier est un ressort portant, aux extrémités, un galet avec des joues d'un diamètre d'au moins 1 pouce en sus au galet, afin que

les joues appuient seules sur le bois, et que ce galet puisse passer pardessus les boulons et ecrous des valets sans y toucher aucunement, ce qui contrarierait la pression regulière que ces joues doivent constamment produire sur le bois.

J'aurais dû dire aussi qu'au moyen de l'outil que plane et blanchit ou peut egalement produire toute espèce de moulures sur le bois; il ne s'agit, pour cela que d'adapter à la place des planes, aux porte-outils, *e*, *h*, des tranchants ou des fraises repondant à la figure que l'on vent sculpter sur le bois.

UNITED STATES OF AMERICA,
State of New York, ss.

[L. S.]

By this public instrument be it known, to all whom the same doth or may in any wise concern, that I, Robert B. Campbell, a public notary, in and for the State of New York, by letters patent under the great seal of the said State, duly commissioned and sworn, dwelling in the city of New York, do hereby certify, that the papers hereto annexed are the certified copies from the Patent office, at Washington, of pages 111, 112, 113, 114, and 115, of volume 41, and of figures 1, 2, 3, and 4, on the left side of plate 12, of the same volume of Brevets d'Invention, and of pages 207, 208, 209, 210, and 211, of volume 23, and of figures 1, 2, 3, and 4, of plate 27, and figures 5, 6, 7, 8, 9, 10, and 11, of plate 28, of the same (23d) volume of Brevets d'Invention, on which were examined before me, John H. Tims, Thomas I. Sloane, Harvey Waters, Loren L. Johnson, and John T. Bruen, witnesses in a certain cause in the United States circuit court, for the district of Massachusetts, wherein Brooks et al. are plaintiffs, and Fiske et al. are defendants, and the translations thereof made by the said John T. Bruen; which certified copies and translations are indicated in the deposition of the said Bruen, as exhibits C, D, E, and F.

In testimony whereof I have subscribed my name and caused my notarial seal of office to be hereunto affixed, the fourth day of April, in the year of our Lord one thousand eight hundred and fifty-one.

ROBERT B. CAMPBELL,
Notary public.

UNITED STATES OF AMERICA,
State of New York, ss.

[L. S.]

By this public instrument be it known, to all whom the same doth or may in any wise concern, that I, Robert B. Campbell, a public notary in and for the State of New York, by letters patent under the great seal of the said State, duly commissioned and sworn, dwelling in the city of New York, do hereby certify, that on this third day of April, A. D. one thousand eight hundred and fifty-one, before me personally appeared John T. Bruen, who being by me duly sworn, says that the

papers hereto annexed are a true and faithful translation of a certified copy from the Patent office at Washington, of pages 207, 208, 209, 210, and 211, of volume 23 of the Brevet d' Invention..

In testimony whereof I have subscribed my name and caused my notarial seal of office to be hereunto affixed, the third day of April, in the year of our Lord one thousand eight hundred and fifty-one.

ROBERT B. CAMPBELL,
Notary public.

(2079)

March 15th, 1817.

Letters patent for fifteen years. For a machine to plane wood of all kinds and dimensions, and to make on that substance grooves, tongues, and mouldings.

To Mr. Roguin (Louis Victor Joseph Marc) of Paris.

The object of this invention is to reduce much the hand work in the preparation of wood, taken in the state of thick planks and boards, in order to extend the use of this substance.

The work in wood, whatever be the use to which it may be destined, can be reduced to four principal operations, which are,

1st. To plane.
2nd. To make tongues and grooves for joining wood.
3d. To make mouldings used for ornaments, and
4th. To make tenons and mortises for putting the work together.

This last operation is not susceptible of being done by a machine, since the place of tenons and mortises depends on the length of the wood in the carpentry, and this length is itself depending on the dimensions of the whole work to be done; but the first three operations can be made, and were indeed performed, by the machine.

Description of this machine.

Plate 27, figure 1st, side elevation. Figure 2nd, the plan.

This machine is formed of a bench composed of two parts, one (*a*) is fixed, and the other (*b*) is moveable, and is called the carriage, of which figure 3 represents a side view. It is carried on six rollers, and moves on a projecting part (*c*) called cornice. It is furnished with a moveable bottom, which by means of screws placed vertically in the thickness of the wood forming the assemblage of the carriage, is elevated or lowered, as the thickness of the wood subjected to the action of the machine may require.

The carriage is drawn by a windlass (*d*,) the axle of which carries on its extremity a wheel (*e*.) into which meshes a pinion (*f*,) the axle of which receives a crank (*g*.)

On the fixed part (*a*) of the bench is placed horizontally an iron shaft (*h*,) represented in figure 4, the journals of which turn in brass boxes chambered in iron supporters (*i*,) it carries a pinion (*k*,) meshing into

wheel (*l*,) which receives the action of the crank (*m*;) it also carries the cylindrical planes whose diameter depends on the effect they are calculated to produce.

The blades with which the cylinders are furnished are made of the thickness of the iron, and are cut obliquely.

In the middle (or centre) of the cylinder is a square hole, receiving the shaft upon which the tools are fixed with pegs.

(*n*) Plane solely destined to plane wood.

(*o*) Plough-plane, making a groove.

(*p*) Connexion of two (plough-planes called match planes) making a tongue.

(*q*) Assemblage of three planes forming a moulding, representing a wave between two squares.

(*r*) Fig. 2. Board laid horizontally upon the carriage, on the border of which the plane (*q*) makes a moulding.

(*s*) Board set vertically upon the carriage, on which the plane (*o*) makes a groove.

(*t*) Board also set vertically upon the carriage, and on which the match-plane (*p*) makes a tongue.

(*u*) Cords, by the aid of which the windlass (*d*) sets the carriage in motion.

(*v*) Frame of wood adapted to the bench and serving to bear the axle of the wheel (*l*) and one extremity of shaft (*h*.)

(*x*) Cross piece of wood, called the guide.

(*y*) Curbed brackets, supporting the pinion (*f*.)

Play of this machine.

While the carriage drawn by the windlass travels, suppose five millimeters (about three-sixteenths of an inch) per second, the plane carried by the shaft (*h*,) set in motion by wheel (*l*,) revolves ten times, the cogs of pinion (*k*) are those of the wheel (*l*) as one to ten.) This plane being furnished with eighteen blades, it results from the combined motion of the tool, and the wood subjected to its action, that one hundred and eighty blades act successively on a length of three-sixteenths of an inch, which, by reason of the slow, regular, and progressive motion of the carriage on which it is placed, presents successively to each blade a new particle of wood to take off.

In the experimental machine, of which an explanation has just been given, the action is imparted by hand. The power thereby gained is counterbalanced by the loss of time, but in a machine on a larger scale it will be different.

The prime mover would be horse power or a steam engine, then the tools could have a larger diameter, have more blades, and able to give power to the mover, could, by accelerating the relative motion of the tools, proportionally increase the progressive motion of the carriage.

The return of the carriage by one of the means furnished by mechanism for changing a continuous circular to an alternate rectilinear motion, would cause a considerable loss of time, since the returning of the carriage would be equal to the time it took to go forward.

In the machine on a larger scale, I purpose to utilize the return, and, by means of a suspension of movement, to lose but the time necessary to return or change the wood for this purpose; a second shaft will be placed after the first, carrying on its extremity a wheel of the same dimension as the pinion of the first, said wheel, meshing into this pinion, will turn, and will cause to turn the second shaft in the contrary direction of the first.

In order that the tools, carried by the second shaft, do not stop the wood its first and forward motion, this second shaft will be carried by hinged supporters in such a manner that it can be raised or lowered at will.

By this simple means the forward and return movements of the carriage are utilized, and there is lost, as I have already said, but the time necessary to return, or change the wood.

Letters patent for improvement and addition, of March 30th, 1818.

Delivered to Mr. Roguin (Louis Antoine Gabriel) cessionary of Mr. Roguin Louis Victor Joseph Marc.

Description of a machine of the same kind as the preceding, but established on a larger scale.

Plan 28, figure 5, lateral elevation. Figure 6, plan.

In the preceding machine the tool is fixed, and the wood advances under it. In the new machine, on the contrary, it is the tool that advances, having two movements, one of rotation, the other of progression. In the first machine the tool was an iron muff, in the thickness of which the blades were cut. In the tool of this machine (as seen in profile figure 7,) a cast iron cutter stock (*a*) is substituted, on which the moveable blades serve to plane and to groove. They are seen in the sectional figures marked with the letters (*b*) (*c*,) they are held by a jaw, the lower part of which is fixed and forms part of the cast-iron cutter stock; the upper part (*d*) (see the details) is moveable, and the blades are pressed, (or held,) seen in figure 7, on the moveable part of the jaw, which do the office of the second iron in double iron plane. This tool is supported by a cast-iron carriage (*f*) (figure 6,) to the hinder part of which is fixed an iron axletree (*g*) bearing two brass pinions (*h*) which mesh into a rack, (*i*,) and which serve to regulate the motion of the carriage.

The table (*k*) moves vertically by means of screws, seen in (*l*) figure 8, which represent a transverse cut of the machine taken at the punctured line marked A, B. In figure 6, these screws support, raise, and lower the table, according as may be required for the thickness of the wood subjected to the operation of the machine.

Four small metal plates are graduated and placed to interior angles of the frame, and which serve as regulators to put the table in a perfectly horizontal position.

(*m*) Two iron brackets, at the extreme ends of the table, serve to steady and keep it from vibrating during the movement of the machine.

The cast-iron carriage (*f*,) which figure 9 represents in elevation,

weighs, including the tool which it carries, about one hundred and ten kilogrammes (about two hundred and forty-two pounds,) it must necessarily be sufficiently weighty so as not to be lifted by the effort made by the tool on the wood, effort, however, now much less considerable in this than in the first machine, since in the latter the tool was perpendicular to the axis, while the level of the new tool is almost tangent to the circumference.

(*n*) Pulley receiving motion from the prime mover, and carrying with it the large pulley (*o*) on which it is fixed, the latter communicates the motion to the tool by the intermediate double grooved pulley (*p*,) which corresponds with the loose pulley (*q*,) (*r*,) axes of pulley; (*n*,) (*o*,) carrying on one extremity a brass pinion.

(*s*) Meshing into wheel (*l*) carrying at its centre a pulley which, by the aid of a rope and another pulley (*u*,) mounted on the end of shaft (*g*,) imparts the movement to the carriage. The rope which passes on the pulleys comes back on the return pulley (*v*.)

The hind part of table (*k*) bears a crotchet (*x*) against which the pieces of wood (z,) come to hit and stop as on a joiner's bench. They are likewise stayed at the other extremity by moveable pincers (*y*,) (or dogs,) placed under a bar (*a*,) through which pass the set screws (*b*.)

The figures 10 and 11 show the side and the top of this bar, furnished with said set screws.

The figure 12 shows an elevation of one of the racks (*i*,) adjusted on the bench (*c*,) and into which meshes one of the pinions (*h*.)

The carriage is brought rapidly back to its starting point by means of a ratchet wheel, (*d*) having the same centre as the wheel (,) figure 5 and 6, and is provided with a click.

The guide represented in the first machine (*x*,) as in the new machine carried by the carriage.

The letters (*e*) and (*f*) in the sectional figures represent, the one a blade for tongueing, and the other one to make mouldings.

Translated from a certified copy from the Patent office, at Washington, of pages 207, 208, 209, and 210, *and* 211, of volume 23, of Brevets d'Invention, by

J. T. BRUEN.

UNITED STATES OF AMERICA,
State of New York, ss.

[L. S.]

By this public instrument be it known, to all whom the same doth or may in any wise concern, that I, Robert B. Campbell, a public notary, in and for the State of New York, by letters patent under the great seal of the said State, duly commissioned and sworn, dwelling in the city of New York, do hereby certify, that on this third day of April, A. D. one thousand eight hundred and fifty-one, before me personally appeared John T. Bruen, who, being by me duly sworn, says that the papers hereto annexed are a true and faithful translation of a certified copy from the Patent office, at Washington, of pages 111, 112, 113,

114, and 115, of volume 41, of the Brevet d'Invention, according to the best of his ability.

In testimony whereof I have subscribed my name and caused my notarial seal of office to be hereunto affixed, the third day of April, in the year of our Lord one thousand eight hundred and fifty-one.

ROBERT B. CAMPBELL,
Notary public.

4244.

March 9th, 1825.

Letters patent for 15 years to M. de Manneville, (Leonare Thomas,) of St. Quentine, for two machines having for object to tongue and groove, to plane and reduce to equal thickness wood destined for flooring, as well as all kinds of boards, whatever their dimensions may be.

By the machine for tongueing and grooving, fig. 1 to 4, pl. 12, the two joints, the tongue and the groove, are made at once.

The side of the tongue is made by means of five circular saws, of which three, *a*, *b*, and *c*, are each mounted on a shaft placed horizontally, and the two others, *d* and *e*, turn horizontally on one and the same shaft, which is placed vertically.

The office of the saw *a*, fig. 1, is to joint the tongue *o*.

That of the saw *b* is to slit the board from underneath to the depth of the tongue *o*.

That of the saw *c* is to slit the board from above to the depth of the tongue *o;* and that of the saws *d* and *e* is to separate the tongue *o* from the wood attached to it above and below, by the cutting the board until they reach the cuts or slits made by the two preceding saws *b* and *c*.

The office of the fork *f* is at once to remove the two small strips *k* and *l*, which by the operation described, have been detached from above and below the tongue *o*, and to remove also the sharp edge or saw fringe of the tongue, in order to facilitate its introduction into the groove *m*, which is being formed at the same time, and which I am going to describe.

It will be observed, that by this process there is, so to say, no loss of wood, and that the two sides of the tongue which the carpenters, with their ordinary tools, plane off slowly and painfully in small shavings, of scarcely any value, form, by this new process, so many small rules or strips, which can be usefully employed in divers works.

The fig. 2 presents the operation of making the groove *m*, the saw *g*, mounted on the shaft of the one parallel *a*, performs like this last the office of jointing, and the two saws, *h* and *j* turning horizontally on a vertical shaft, slit the boards parallel, precisely to the depth the groove *m* ought to have, being calculated to receive a tongue similar to the one above described.

The groove is hollowed or cleaned by a plough plane, armed with several irons set one in advance of the other, and which cut gradually;

it receives a precipitated, backward and forward, movement from the common mover of the whole operation.

To one of the instruments, or irons, I adapt a small tool in the form of a triangle, the office of which is to remove the sharp edges or saw fringe of the two sides of the groove.

For the same purpose I also use sometimes a tool carrier *n*, mounted on a vertical shaft furnished with several irons, resembling those of a plough plane, with the exception that they present themselves alternately in the contrary direction, and obliquely to the encounter of the wood, which they remove neatly.

The board which is to be tongued and grooved is previously well adjusted on a carriage, moving between two guides, not permitting any variation, and which bring the wood to the work according to the will of the operator.

To effect that the board may present itself to the tools with the least warp. I employ a lever, the weight of which rests through a roller on the board, where it begins to be cut by a movement of the foot, or otherwise; its weight can be increased or diminished by gliding the weight from right to left, or from left to right, as may be required.

This lever resembles a balance, at which the same weight, by a forward and retrograde movement, serves to determine the weight of any object whatever, with the simple difference, however, that the support is placed between the weight and the object to be weighed, while here the beam is fixed behind, and it is the roller which forms the point of support.

Application can also be made of all other systems of weighing. I myself have, at one of my tables, employed another, where I have enclosed all the mechanism in a cylinder of only 18 inches, by means of two openings of about two inches in height on each side of the cylinder, in which are concentrated all the working utensils, and which are not seen; the wood enters rough and comes out finished from the cylinder.

An aperture is reserved underneath, allowing the escape of the mouldings or strips made by the saws.

The same operation, which has just been described for the sides, can, by the same machine, be obtained on the ends, whatever may be the bevel desired to be given to the pieces; all the secret, then, consists in the direction to be given to the carriage, which brings the wood in contact with the tools.

I believe it is useless to describe minutely the bench on which the utensils are fixed, the kind, the bearing, and the dimensions of the various wheels, because it belongs to the constructor to calculate the motions which are to produce the desired effect, and to prevent the action of some parts from opposing the play of other parts.

It is useless to mention, after what has been said in this specification, that all should be calculated so that the same machine may equally well match boards of all sizes, thickness, and lengths.

Also, the saws, the plough planes, or tool carriers, etc., must neces-

sarily be susceptible of being moved towards and from each other, of being raised or lowered, and the saws, *b* and *e*, of being sloped in the inverse sense, or reciprocal direction, as may be required.

The machine of my invention, which I describe, unites all these advantages, and can be easily attended by one man having the wood in his proximity, operate upon from two to three thousand feet in twelve hours.

To plane or reduce to thickness any board whatever, (*) it is laid on rollers, the axles of which are placed horizontally.

Two fluted cylinders placed vertically, and parallel to each other, press the board on both sides.

The journal boxes of one are fixed, those of the other are moveable in slots, to correspond with the variation in the thickness of the wood to be planed.

The effect of a spring, or a weight, on the latter journal boxes, produces an equal and constant pressure of the cylinders against the board.

Two tool carriers, armed with double iron planes, obliquely placed in an inverse sense, (contrary direction,) are moved forward and backward by a double brace, or crank, one of the extremities of which the moving wheel is placed.

One of these tool carriers (which make a precipitated reciprocating movement) must not rise nor fall, neither move from nor towards the board; it is the latter which comes to find it; while, on the contrary, the other tool carrier must be susceptible of being moved from or towards the board at will.

When the board is reached and reduced to a desired thickness, the tool carrier meets the roller on which it rubs, preventing the instrument from cutting further in the wood.

The rollers should be mounted in such a manner that they can be set, since it is upon their separation, or position, that the thickness of the wood will depend.

Springs or weights bring the tool carrier in contact with the wood gradually.

Besides the two cylinders, of which I have just spoken, there are two others at the extremities of the frame, or bench, likewise placed vertically, but they are fixed in their journal boxes; because when the board comes to them it has received all its operation, is reduced to the desired thickness, and needs these last but for its outward direction, after having quitted the first or introducing rollers.

All the cylinders carry on their heads each one a wheel, of which the diameter must be calculated according to the thickness of the wood which is being worked. The first two mesh into each other, and the last two likewise.

Above each wheel a toothed wheel for an endless chain is placed, or

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* The drawings of this machine not being joined to this file of papers, an explanation only can be given.

else a treble brace or universal crank, which answers, by the aid of a winch, to set the four cylinders together in motion by hand.

The first two conduct the board to the work.

April 28th, 1825.

Letters patent for addition and improvement.

In the description of my means of execution, deposited at Paris, in the secretary's office of the department, on the 18th of December, 1824, in which I fear not having been explicit enough, I there said:

"The board which is to be tongued and grooved is previously adjusted on a carriage moving between two guides, not permitting any variation, and which forwards the wood to be worked according to the will of the operator."

Then I meant a carriage conducting the wood past the cylinder, which, after detaching the worked wood from it, had each time to be brought back to its first position, in order to receive anew the wood to be worked, which occasioned, necessarily, a loss of time, which it is important to prevent.

This plan, which, however, I do not renounce for certain purposes, had the inconvenience of obliging the workman at each piece of wood which he matched, to displace himself twice; first, he had to fix the piece of wood on the carriage in front of the cylinder, then go behind to detach the worked pieces from the carriage, and then return again to bring the carriage back to its first position, in order to receive wood anew.

This manner of operating condemned the workman to perpetual action, was fatiguing, and occasioned a considerable loss of time.

To remedy this inconvenience two workmen would have been wanted instead of one, the one in front, the other behind the cylinder, and the result would have been an increase of expense of manipulation of one hundred per cent. I have now found a means which dispenses with all operation behind the cylinder, saves much time, and infinitely simplifies the operation.

The improvement consists in this. Like almost all conductors the carriage in the first machine was one piece, but it is now formed of a number of small parts, of two, four, or six inches long, more or less, put together with hinges, and then forming a whole, perfectly equal in width and thickness. Each of these divisions bears a rack, and also one or two square holes, larger below than above, in which the bolt heads are lodged, which tighten the dogs or holdfasts.

By uniting these separate parts a sort of chain is composed, which being securely held in its march between two well appropriated guides, forms my new carriage. When it has passed the cylinder, and, consequently, the wood upon it has been subjected to its action, and bends itself by its own weight, and becomes, by the simple play of the hinges, disengaged from under the dogs, it falls to the ground, and each part or link of the carriage doubles, and returns below the machine, and comes

alternately back to its starting point before the cylinder, and receives anew the wood under the dogs, while the plough plane by itself works actively the joints, the tongue, the groove, and rids itself of the wood by degrees, as it is worked.

I believe it is proper to explain that one of my means of pressure employed on the wood of which I have meant to speak in the description of the 18th December last, is a spring carrying on its extremities a roller with cheeks or projecting parts of a diameter at least one inch more than the grooves, so that only the cheeks bear on the wood, and the roller can pass over the bolts and screw nuts of the dogs without touching them, which otherwise would interrupt the regular pressure the cheeks should constantly produce on the wood.

I should also have said that all kinds of mouldings are likewise produced on wood by adapting to the tool carrier, which planes and smoothes, cutters or burrs corresponding to the figures which are to be carved, instead of the blades for planing with which the tool carriers (*e*) and (*h*) have been furnished.

Translated from a certified copy from the Patent office, at Washington, of pages 111, 112, 113, 114, and 115, of volume 41, of the Brevet d' Invention.

By J. T. BRUEN.

[For drawings, see original, page 158.]

ARTEMAS L. BROOKS, Ignatius Tyler, Wm. W. Woodworth, admr., and James G. Wilson,
vs.
JOHN FISKE and Nicholas G. Norcross. } In equity.

In the circuit court of the United States for the district of Massachusetts.

The deposition of David A. Hall, of the city of Washington, in the District of Columbia, a witness produced, sworn, and examined in a certain cause depending in the circuit court of the United States, for the district of Massachusetts, in equity, wherein Artemas L. Brooks, Ignatius Tyler, Wm. W. Woodworth, admr., and James G. Wilson, are plaintiffs, and John Fiske and Nicholas G. Norcross are defendants.

That is to say, David A. Hall, being first carefully examined, and cautioned, and sworn to testify to the whole truth relative to the before mentioned cause, or matter in controversy, deposes and says, as follows:

The said Hall saith, that some time in the summer of 1850 he had a conversation with the honorable Edmund Burke, late commissioner of patents, touching his intended occupation and pursuits, he having then recently dissolved his connexion with Thomas Ritchie as a co-editor of the newspaper called the Union.

In that conversation Mr. Burke said it was his purpose to return to the North, and devote himself to the practice of his profession as a lawyer, with particular reference to patent cases, in which he thought he should have a special advantage from his recent well known connexion with the Patent office. And, in proof that this expectation of success was well founded, he proceeded to say that he was already engaged in a cause in which he was to have a fee of two thousand dollars; it was a case on the Woodworth patents, against one Norcross, and it either arose, or was to be tried, in Lowell, Massachusetts. Whether this fee was to be certain and payable at all events, or contingent upon success only, I cannot say from any distinct recollection of his words, but the impression left on my mind is that it was to be a contingent fee.

DAVID A. HALL.

CITY OF WASHINGTON,
District of Columbia.

I, Walter Lenox, mayor of the city of Washington, in the district aforesaid, not being of counsel or attorney for either of said parties, nor in any manner interested in the event of the said cause, do hereby certify, that the aforegoing deposition of David A. Hall was taken before me, in my office in the City Hall, in the city aforesaid, on the 14th day of May, in the year eighteen hundred [and] fifty-one; that the said deposition was reduced to writing by the deponent in my presence at the said time and place, and so also subscribed by him, the said deponent being first by me carefully examined, and cautioned, and sworn to testify to the whole truth relative to the before mentioned cause or matter in controversy. The said deposition was taken at the instance of the defendants in the said cause, and the reason for taking the same was that the residence of the said deponent, at the city aforesaid, is a greater distance from the district of Massachusetts aforesaid, the place of trial, than one hundred miles. Neither the adverse party nor his attorney are within one hundred miles of this place, and therefore they were not notified by me of the taking this deposition, nor present at the taking thereof. And I do further certify, that the said deposition is by me sealed up, and directed to the said circuit court of the United States of the district of Massachusetts.

In testimony whereof I have hereunto set my hand and caused the seal of the said city of Washington to be affixed, this 14th day of May, in the year of our Lord eighteen hundred and fifty-one

WALTER LENOX, *Mayor.*

Expenses $5 00.
Attest:

WM. J. McCORMICK,
Register.

Copy of the record of the case of William W. Woodworth vs. Rhodolphus C. Edwards, James H. Edwards, and Cyrus Smith, referred to in complainants' bill.

UNITED STATES OF AMERICA,
Massachusetts district.

May term, 1848.

At a circuit court of the United States, begun and holden at Boston, for the first circuit and district of Massachusetts, on Monday, the fifteenth day of May, in the year of our Lord one thousand eight hundred and forty-eight; before the honorable Levi Woodbury, associate justice; Peleg Sprague, district judge.

WILLIAM W. WOODWORTH, of Hyde Park, in the northern district of New York, esquire,
vs.
RHODOLPHUS C. EDWARDS and James H. Edwards, both of Worcester, in our district of Massachusetts, machinists, and Cyrus Smith, of Boston, in said district, manufacturer.

In a plea of trespass on the case, for that, whereas, heretofore, viz., on the eighth day of July, in the year of our Lord one thousand eight hundred and forty-five, letters patent, bearing date on the date and year last aforesaid, signed by James Buchanan, secretary of State, and countersigned by Henry H. Sylvester, then the acting commissioner of patents, and bearing the seal of the Patent office, were duly issued, reciting that William W. Woodworth, administrator of William Woodworth, deceased, of Hyde Park, New York, has alleged that said William Woodworth invented a new and useful improvement in machines for planing, tongueing, grooving, and dressing boards, &c., for which letters patent were granted on the twenty-seventh day of December, in the year eighteen hundred and twenty-eight, which letters patent have been extended (as will appear by the certificates appended thereto, copies of which are hereunto attached) for fourteen years from the expiration of the said letters patent; and which letters patent are hereby cancelled on account of a defective specification; which he states has not been known or used before the said William Woodworth's application; has made oath that he is, and the said William Woodworth was, a citizen of the United States; that he does verily believe that the said William Woodworth was the original and first inventor or discoverer of the said improvement; and that the same hath not to the best of his knowledge and belief been previously known or used; has paid into the Treasury of the United States the sum of fifteen dollars, and presented a petition to the Commissioner of Patents signifying a desire to obtain an exclusive property in the said improvement, and praying that a patent may be granted for that purpose; (all which said recitals in the said letters patent contained the plaintiff avers to be true;) and in and by the said letters patent there was granted, according to law, to the said William W. Woodworth, in trust for the heirs-at-law of the said William Woodworth, their heirs, administrators, or assigns, for the term of twenty-eight years from the twenty-seventh day of December, one thousand eight hundred and twenty-

eight, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said William W. Woodworth, in the schedule to the letters patent annexed, and made a part thereof. And the plaintiff avers that afterwards, viz., on the first day of June, in the year now current, and on divers days and times before and afterwards, viz., at Boston aforesaid, and Worcester aforesaid, the said defendant did make, use, and vend to others to be used, divers, viz., twenty machines, constructed substantially like the said planing machine patented as aforesaid, and in violation of the exclusive rights secured to the said plaintiff as aforesaid, whereby an action has accrued to the plaintiff to recover of the said defendants the damages by him sustained in the premises, and such additional sum, not exceeding in the whole three times the amount of the said actual damages as the said court may think just, to the damage of the said Woodworth, as he says, the sum of five thousand dollars.

This action was entered at the October term of this court, A. D. 1847, when the parties appeared by their respective counsel, when, to wit, on the 28th day of March, A. D. 1848, the defendant filed a plea, which is in the words following, to wit:

Circuit court of the United States, district of Massachusetts, October term, 1847.

WILLIAM W. WOODWORTH
vs.
JAMES H. EDWARDS and als.

And now the said defendants come, &c., when, &c., and say they are not guilty of the premises above laid to their charge, or any or either of them, or any part thereof, in manner and form as the plaintiff has above thereof complained against them; and of this they put themselves upon the country. By

J. T. TASKER,
Of counsel for defendants.

And the plaintiff, by his attorney, doth the like. By

B. R. CURTIS,
His attorney.

And for further plea in this behalf, by leave of the court for this purpose first had and obtained, the defendants say that Daniel Dunbar, of Boston, in said district, formerly of Hudson, in the State of New York, machinist, was the actual inventor and maker of the identical machine or improvement patented and claimed by the said William Woodworth, deceased, as averred in the plaintiff's declaration, and previous to the pretended inventions thereof by the said William Woodworth; and that of all this the said William Woodworth, deceased, had full knowledge at the time of the said invention by the said Dunbar; and this they are ready to verify. By

J. T TASKER,
Of counsel for defendants.

And on the 31st day of said March filed the following notice of defence:

To B. R. CURTIS, esq.,
Counsel for the plaintiff.

SIR: Please to take notice, that on the trial of the above entitled cause, without waiving the right to require the plaintiff to make out all facts essential to support and prove his declaration and case, and without admitting any part thereof, the defendants will, under the general issue, give in evidence, prove, and insist upon, the following special matter (of which notice is required by the statute) in addition to such other defence as they are by law entitled to make.

1. That the extension of the said Woodworth patent, as averred, was fraudulently obtained, and upon false representations made to the board for the extension of patents, and to Congress, by the said William W. Woodworth, administrator, and his agents, and that the same is void in law.

2. That said patent, issued July 8th, 1845, is not for the same invention as the original patent, issued December 27, 1828; and the said William W. Woodworth, in the amended specification, fraudulently described what said William Woodworth did not invent.

3. That said William Woodworth, deceased, was not the true and first inventor of said improvement, nor of any material or substantial part thereof, claimed in the said patent, granted December 27, 1828, and extended as averred.

4. That the use of pressure rollers, in combination with plane irons, to hold down the board while planing, was well described in the patent granted to Samuel Bentham, in England, November 26, 1791, and published in the Repertory of Arts and Manufactures, vol. 5, pp. 303, 304, in 1796; and that the use of a cutting roller, in combination with a bench, to be made to raise and fall, so as to determine the thickness to which a board will be reduced by being made to pass under the roller, was well described in a patent granted to said Bentham, in England, April 22, 1793, and published in said Repertory of Arts and Manufactures, vol. 10, p. 303, in 1799; and the use of rotary cutter frames, mounted on vertical or horizontal shafts, and being regulated by a screw, or otherwise, so as to approach nearer the work or recede at pleasure, in order to determine the depth of the cut, was well described in the patent granted to J. Bramah, in England, in 1802, for producing straight, smooth, and parallel surfaces, &c., on wood and other materials, and published in the said Repertory of Arts and Manufactures, vol. 2, new series, p. , in 18 , subtantially like the said Woodworth machine, and prior to the pretended invention thereof by the said William Woodworth, deceased.

5. That in 1817, and afterwards, J. B. Bennett, now of East Boston, Massachusetts, and Fitch or Flint, and Howard and Gleason, of a place called Oak Orchard, in the county of Orleans, in the State of New York, had knowledge of a planing machine substan-

tially like the said Woodworth machine, made and publicly used in said county of Orleans by . Bennett, deceased, brother of said J. B. Bennett, for planing staves for salt casks, prior to the said pretended invention of the said William Woodworth, deceased.

6. That in 1818, and afterwards, feeding and pressure rollers were known to and used by James Baldwin, late of Westford, in the State of Massachusetts, for the purpose of holding down and feeding through the boards in his planing machine, patented in the United States March 7, 1818.

7. That in 1818, and afterwards, Amos Bishop, of the town of New Lebanon, in the county of Columbia, in the State of New York, had knowledge of, and publicly used in said town, a machine, embracing cutter wheels and pressure rollers in combination, for tongueing and grooving at one operation, and cutter wheels in combination with pressure rollers, for tongueing or grooving, substantially like the said Woodworth machine, and prior to the said Woodworth's pretended invention thereof.

8. That in 1820, and afterwards, James Hill, of Lynn, and Joseph Hill, of South Woburn, Massachusetts, had knowledge of, made, and publicly used, a planing and moulding machine, called a sash machine, substantially like the said Woodworth machine claimed in said patent, and prior to the pretended invention thereof by the said William Woodworth, deceased; and the said James Hill has continued to use, and now uses, his said machine for planing and moulding sashes.

9. That in 1822 and 1823, and afterwards, Thomas Blanchard, of Boston, Massachusetts, had knowledge of, made, and publicly used, a planing machine substantially like the said Woodworth machine, in Grafton and Springfield, Massachusetts, prior to the pretended invention thereof by said Woodworth, deceased.

10. That in 1824, and afterwards, John R. Averill, of Manchester, in the State of New York, had knowledge of, made, and patented in the United States, December 29, A. D. 1824, a planing machine for dressing staves, substantially like the said Woodworth planing machine, and prior to the pretended invention thereof by the said William Woodworth, deceased.

11. That in 1824, and afterwards, Luther Gifford and Henry Gifford, of Syracuse, in the county of Onondaga, in the State of New York, had knowledge of a planing machine substantially like the said Woodworth machine, invented, constructed, and publicly used in said Syracuse by Uri Emmons, deceased, prior to the said pretended invention of said William Woodworth.

12. That in 1826 David N. Smith, late of Warwick, deceased, had knowledge of, made, used, and patented in the United States, December 28, 1826, a planing machine, substantially like the said Woodworth planing machine, and prior to the pretended invention thereof by the said William Woodworth, deceased.

13. That in 1827, prior to the said Woodworth's pretended invention claimed in said patent, the same invention, or a material and sub-

stantial part thereof, was well described in the specification of the patent granted to Malcom Muir, of the city of Glasgow, in Scotland, dated June 1st, A. D. 1827, an abstract of which was published in the London Journal of Arts, second series, vol. 2, p. 68, a work extensively known in the United States; and also in the same work, conjoined series, vol. 1, pp. 49 and 57.

14. That in 1827 Josiah Reihm, of Savage factory, in the State of Maryland, had knowledge of, made, used, and patented in the United States, November 1, 1827, a planing machine substantially like the said Woodworth planing machine, and prior to the said pretended invention thereof by the said William Woodworth, deceased.

15. That in 1827 and 1828, James Hill, of Lynn, Joseph Hill, of South Woburn, Aaron Hill and Daniel Hill, of Stoneham, and Leonard Gibson, of Cambridge, in the State of Massachusetts, had knowledge of, and the said James, Joseph, and Leonard did use in Woburn, in said State, a planing machine made by the said James and Joseph, in principle and mode of operation substantially like the said Woodworth planing machine, and prior to the pretended invention thereof by the said William Woodworth, deceased.

16. That in 1828, John Hale, formerly of Oakham, in the State of Massachusetts, now of Bloomfield, in the county of Ontario, in the State of New York, had knowledge of, made, used, and patented in the United States, June 21st, A. D. 1828, a planing machine substantially like the said Woodworth planing machine, and identically the same thing as the first claim in the said Woodworth patent, issued July 8th, 1845, as averred, and prior to the pretended invention thereof by the said William Woodworth, deceased; and the said Hale patent was recorded anew May 13, 1837, and the said Smith patent was recorded anew May 6, 1837.

Most respectfully, yours, &c.,
J. T. TASKER,
Of counsel for defendants.

Issue being joined as aforesaid, the cause, after a full hearing, was on the fourteenth day of April, A. D. 1848, committed to a jury sworn according to law to try the same, who after hearing all matters and things concerning the same, returned their verdict therein, and upon oath say:

The jury find the said defendants guilty, in manner and form as the plaintiff has thereof alleged against them, and assess damages in the sum of five hundred dollars.

ARTEMAS HAMMOND.

Afterwards, at the same term, to wit, on the twenty-first day of said April, the defendants filed the following motion for a new trial, to wit:

And now the defendants come and move this honorable court, that the verdict in said case may be set aside, and a new trial granted: 1st.

Because that said verdict is against the evidence. 2d. Because the said verdict is against the weight of evidence.

J. T. TASKER, *for defendants.*

The cause was thence continued to the present term, when, after a hearing of the parties by their respective counsel, upon the motion aforesaid, it was ordered by the court that the said motion be overruled.

Whereupon, on the fifth day of July, A. D. 1848, it is considered by the court, that the said plaintiff recover of the said defendants the sum of five hundred dollars damages, and costs of suit taxed at three hundred and seventy-nine dollars *dollars* and fifty-nine cents.

UNITED STATES OF AMERICA,
Massachusetts district, ss.

I, Isaac O. Barnes, clerk of the circuit court of the United States, for the first circuit, Massachusetts district, do hereby certify, that the foregoing is a true copy of the record of the case of William W. Woodworth vs. Rhodolphus C. Edwards and al.

In testimony whereof I have hereunto subscribed my name, and affixed the seal of the said court, at Boston, this twenty-fourth day of April, A. D. 1852, and in the seventy-sixth year of the independence of the United States of America.

[SEAL.]

ISAAC O. BARNES, *Clerk.*

Copy of defendants' requests to Judge to instruct the jury, and his answers thereto, in the case of William W. Woodworth vs. Rhodolphus C. Edwards et al., filed at the trial of said case.

Request the court to charge—

1. "Whether the new patent of 1845 be substantially for a different invention from the patent of 1828, is a question for the jury on the evidence. (4th Howard, 403.)

Answer. It is subject to the rules of evidence in respect to it, stated by the court.

2. (4th Howard, p. 670.) The 8th question, certified up to the Supreme Court, is in these words:

"Whether the court can determine upon an inspection of the said two patents and their respective specifications, that the said new patent of the 8th of July, 1845, is not for the same invention for which the said patent of 1828 was granted."

Answer. No.

P. 688. "That the question involved in the 8th point propounded, does not present any question of law which this court can answer?"

Answer. None, except as charged to the jury.

Instruct the jury that, if the mere changing the keyed rollers were only such an alteration or addition as any mechanic of ordinary skill would naturally make, then the mere change of those rollers was not the subject of a patent.

It was not, unless it introduced a new principle and answered a new end.

That, if the jury are satisfied that Dunbar invented the cutter wheel, represented in his model, and described in the plaintiff's patents of 1828 and 1825, such invention negatives Woodworth's right to such a cutter wheel; that plaintiffs have never claimed any other wheel; so that defendant has either combined a cutter like Dunbar's, with his feeding apparatus, a combination in which, and in each element of which, plaintiffs have no right, or else have used a cutter substantially unlike plaintiffs', and therefore no infringement.

Answer. In such case we could not patent the cutter wheel alone, but only in combination with something else, not before combined together.

That if Hale's machine contained the same elements and the same combination, claimed by plaintiffs, then, although said machine had not operated successfully, so as to be permanently employed, plaintiffs had not a right to adopt Hale's elements and combination, and claim to hold them as his own patentable invention.

Answer. Plaintiffs have no right to patent exactly such a combination as some one had invented before; and a prior invention is not a bar, if it was useless and abandoned.

That the words in Woodworth's specification of 1845, "employment of rotating planes, substantially such as herein described," limit his invention to such rotating planes as he has expressly described in his preceding specification; and that if the cylinder used by defendant substantially differs from these rotating planes, such use is no infringement of plaintiff's rights.

Answer. If it differs in principle from them, not without.

That the plaintiffs in patent of 1845 claiming combination of their cutter with certain rollers "as described," is limited by his previous description; and if from said previous description it appears that the rollers used by plaintiff were feeding rollers, and used for that purpose, and if the jury find that defendant does not use rollers for feeding, as described by plaintiff, but feeds by a substantially different arrangement of means, such use is not an infringement of plaintiff's rights.

Answer. The rollers may be used for pressure as well as feeding; and the use of the combination of the cutter knives with them is not different by changing the mode of feeding by some mechanical equivalent or analogous device.

That simply changing the form or the proportions of any machine in any degree is not a patentable invention.

Answer. Unless so changed as to introduce a new principle or new material results.

That a change of form which produces a difference in the degree of the result, but not in the kind of the result, does not, because of such difference, constitute a patentable invention.

Same answer.

To instruct the jury.

That if the patent of December 27, 1828, was not at the time of its surrender inoperative or invalid by reason of a defective or insufficient description or specification, or by reason of the patentee claiming in his specification as his own invention more than he had a right to claim as new, then the surrender was unlawful, and the new patent of July 8, 1845, is void.

Answer. Decision of commissioner is prima facie binding as to that, but rebutable.

That a patent is valid and operative in law, when it has been found so by the verdict of a jury trying its validity, sanctioned by the judgment of the court; and when the patentee and his assigns obtain injuntions restraining the unlicensed use of any machine described or indicated by the specification and drawings.

Answer. This question does not arise, as there is no evidence of a former trial when this objection was taken.

That if the specification of December 27, 1828, was defective, yet if the defect did not arise by inadvertency, accident, or mistake, but from a fraudulent and deceptive intention, and if so, the patent is void.

Answer. Yes. But finding of commissioner is prima facie the other way.

That if said patent of December 27, 1828, was invalid or inoperative by reason of a defective or insufficient description or specification, yet if the patentee did not within reasonable time specify anew to cure such defects, that is a circumstance which the jury may take into consideration to determine whether the defect, if there was any, arose from fraud.

Answer. No such point made. But jury may consider it as to fraud or not.

That if the patentee in his patent of November 15, 1836, fully described any of the operating parts of the machine now claimed as of the invention of 1828, and made oath that the operating part of machinery itself in the two machines of 1836 and 1828 are unlike and dissimilar, and bear no resemblance to one another, and that the machine patented in 1836 is not an infringement upon, or in addition to the machinery patented in 1828, that is conclusive evidence that no part of the machine of 1836 was embraced in the machine or covered by the patent of 1828.

Answer. Not exactly pertinent, probably. But it may be considered, though not conclusive.

That if the Hill machine actually did exist and was used as testified by the Hills, and Gilson and Gould, and actually did embrace the combination now claimed by plaintiff, as testified by Adams and Coney, and if Woodworth's only made an improvement upon said machine, and has claimed the whole machine or whole combination instead of his improvement only, then his patent is void for having claimed too much.

Answer. No; unless Hill's was earlier and worked well, and was not abandoned.

If the cutting cylinder in defendant's machine is not substantially the same as that described and included in the claim of Woodworth's, then defendants have not infringed.

Answer. The two machines are to be compared, and the jury decide if the last contains the important principles in the first, though it may also contain some additions or changes.

That the application of rotating knives, such as before known and used for planing gun stocks, and other materials, to the planing of boards, is not a substantive patentable invention.

Answer. No such question here, as the patent is not for a new part but a new combination. But it would not be if the object was merely changed, and no change in the machine.

That if the substituting a solid cylinder with knives attached to longitudinal flanches, instead of a cutting wheel with knives attached to its heads by screws, produces a rotary cutter containing a new principle, to wit, a firm and continued support for the blade, and thereby performing better work, and so materially affecting the result, such a solid cylinder is patentable as a substantive new invention, and the use of it is not an infringement upon a patent right to use the double headed wheel with the detached knives.

Answer. No such question arises, and has been argued.

But it alone might be patentable, though different in principle; though it would not justify using with it any old and useful combination which had before been patented.

A true copy. Attest: ISAAC O. BARNES, *Clerk*.

And on the part of the respondents the following proofs, filed in said cause were, at the hearing, read and admitted:

UNITED STATES OF AMERICA,
Massachusetts district, ss.

[L. S.] The circuit court of the United States, within and for the Massachusetts district.

To George S. Hillard, of Boston, esquire, commissioner of the United States courts for Massachusetts district.

Know ye, that reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed of James Hill, of Lynn, in the county of Essex, and Joseph Hill, of Winchester, in the county of Middlesex, in the district of Massachusetts, witnesses to be examined on behalf of the respondents, and to be used in a certain cause now pending in said court, wherein Artemas L. Brooks et als., complainants, versus John Fiske et al. are respondents.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses as aforesaid to be brought before you, and each witness, while present before you, to examine carefully on oath touching the premises. And when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence. And the same so taken and subscribed, to return, together with this commission and your doings herein enclosed, sealed and directed to the circuit court aforesaid, to be holden at Boston, as soon as the same shall have been executed.

In testimony whereof we have caused the seal of the said circuit court to be hereunto affixed.

Witness the honorable Roger B. Taney, at Boston, this tenth day of March, in the year of our Lord one thousand eight hundred and fifty-one.

ISAAC O. BARNES,
Clerk of the circuit court of the United States, Massachusetts district.

N. B. You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the depositions, either by himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the deponents while giving their depositions in answer to the interrogatories annexed to this commission. And you shall take such deposition in a place separate and apart from all other persons, and permit no person to be present during such examination, except the deponents and yourself, and such disinterested person (if any) as you may think fit to oppoint as a clerk, to assist you in reducing the depositions to writing. And you shall put the several interrogatories and cross interrogatories to the deponents in their order, and take the answer of the deponents to each, fully and clearly.

Circuit court of the United States, Massachusetts district.

BROOKS and others
vs.
FISKE and another. } In equity.

Interrogatories to be proposed to James Hill, of Lynn, in the county of Essex, and Joseph Hill, of Winchester, in the county of Middlesex, and district of Massachusetts, witnesses to be examined in behalf of the defendants.

1. State your age, residence, and occupation, and how long you have been engaged in your occupation.

2. Are you acquainted with the specification and drawings of the patent granted by the United States of America to Nicholas G. Norcross, on the twelfth day of February, A. D. 1850, for an improved planing machine? If so, state whether the description therein of the Hill machine, so called, is a substantially correct description, or how otherwise,

of any planing machine made or used by you, at any and what time and place.

3. If you made or used any such machine as is described and called the Hill machine in said Norcross patent, state particularly the time when you first made or used such machine, and how you remember and fix such time; the place where you made or used it; state how long the machine was used, and how it worked, whether well or otherwise; state the reasons and circumstances which led you to make or use such machine, if any.

4. State all the material parts of said machine, their size, shape, and the materials of which they were made and how they were put together, and state what has become of said machine and its several parts, so far as you know; where and when did you last see the machine, or any of its parts, and what parts, and can the same be now produced.

5. State how the boards were placed in said machine, if at all, and whether it reduced them to a uniform thickness, or only surfaced them.

6. State, if you can, to whom the making or using of such machine by you was known at the time, and state fully all the circumstances by which you remember and fix the time of making and using such machine.

7. Do you know, or can you set forth, any other matter or thing which may be a benefit or advantage to the parties at issue in this cause, or either of them, or that may be material to the subject of this your examination, or the matters in question in this cause? If yea, set forth the same fully and at large in your answer.

J. GILES, *for defendants.*

A true copy. Attest.

ISAAC O. BARNES, *Clerk.*

Cross interrogatories.

1. Have you ever before testified in any cause of or concerning the alleged machine you are inquired of; if so, state when, where, and how often, and whether orally or in writing.

2. Have you preserved notes of your testimony in any such cause; if so, produce and append them, all and every copies thereof.

3. Has any one shown you, previous to your giving your answer to this question before the commissioner, any, or copies of any, of your former affidavits, statements, or testimony; if so, when and where, and who was the person?

4. Have you read or heard read any alleged copy of, or original draft of, your former testimony on the subject of the alleged Hill machine; if so, who showed it to you, or read it to you; where did said writing come from; who made the said draft, copy, or original, and where, in whose possession has it been since made; what evidence have you of its being a correct or authentic copy. If the same is in your possession please append it; if not, state where you last saw the same,

in whose hands, and whom do you now suppose to have possession of the same.

5. Have you ever expressed yourself, in testifying as a witness, uncertain of the date or year when you first saw the alleged Hill machine, or any part thereof?

6. If you now state any date as the time when you first saw the alleged Hill machine, or if you attempt to identify any material as being part or parts of such alleged original machine, state carefully and exactly when you first saw each and every part which you attempt to identify as part of such alleged original; when saw and where you first saw it, and by what means or marks you identify the same; whether or not the same has been changed or altered, in any part; if so, how, where, when, and how much.

7. State, and give particularly, where you lived, with whom you worked, the length of time, subject of labor, name of town, and exact rotation and date of commencement, and sending of each of said, from the first of January, eighteen hundred and twenty-six, to the first of of January, eighteen hundred and twenty-nine; state also, if you have, in any former affidavit or testimony, varied in any particulars the facts which you now state; give your reasons for each and every such change that you now make from your former statements, and the evidence on which you have so done, if any such exists; if you have done so on hearsay or conversation with others, state that fact. Also name the person or persons who has or have conversed with you on the subject of the dates of invention or use of the alleged Hill machine, or on the dates of your changes of employment, or places of residence.

8. Has or has not the exactness of your recollections on the subject of this alleged invention been at any time disputed by any one, and give their names; state whether or not witnesses have been called in other trials to contradict the facts you then stated with regard to this alleged Hill machine, and the dates you gave connected with it.

9. How was the knife set on the cylinder in the original Hill machine?

10. In what state was the Hill machine when you first saw it; upon what stuff was it working; give the exact location where it was in the building, and the location of the building.

11. What was done with the work of the said machine, to what purpose applied, to whom sold, and when; was the work a smooth and even surface when finished, or how otherwise; how long was said machine used; state precisely, give the exact date when its use was discontinued.

12. Whether or not you know Wm. Beers, and had he any interest or partnership with either of you, at any time between 1826 and 1829, and what, and where; state fully any connexion existing between you and said Beers at that time.

13. Whether or not you have any memorandum or books of accounts which include any work sold, or done, or other thing in connexion with the said machine; if so, produce and append them; state

whether you ever had any, when you last saw them, where they now are, whether you ever examined them to refresh your memory, and when you last did so.

15. Who first called on you to obtain information as to said machine, and when; also, when were you first applied to, to testify, and by whom; and have you since then examined your books or memorandum of dates or accounts, as asked in preceding question; if so, to what extent, how often, and at what times?

16. When did you first hear of the Woodworth patent?

17. Did you ever take any and what steps to obtain a patent for the Hill machine; state fully.

18. When did you first set up, or examine for the purpose of setting up, the pretension of prior invention or use of your machine, over the Woodworth patent; state any, all, and what steps you took, and what evidence exists now of your making any such examination or pretensions.

19. Did you invent any part of said machine, or help to invent any part; if so, when, and what part, be particular and exact.

20. State all changes and modifications of the parts of said machine, were made, give the form and position of parts, what difficulties occurred, how they were surmounted, when, and by whom; be full and explicit.

21. Who was the last person to whom you sold boxes planed by this machine, did you make any others after this; if so, how were they planed, and to whom sold?

22. If you have identified any machinery as being part of original Hill machine, say at what public trial did you last see it exhibited, and whether or no all its parts are in the same state they were when first exhibited there; and were any of said parts altered in shape during said trial; if so, what parts, and by whom?

23. How many rooms were there in the building where said original machine was used, and to what uses were they put?

24. Did you ever use a Bramah wheel in said mill, and where; or any planing wheel that cut on the disc?

25. Do you know Samuel Abbot and Elijah Wyman; if so, how long have you known them?

A true copy. Attest:

ISAAC O. BARNES,
Clerk of court.

Deposition of James Hill.

Answers of James Hill to the interrogatories hereto annexed on the part of the respondents.

1. To the first interrogatory he says: I am sixty-six years old; I reside in Lynn; I have been enagaged in machine building, house carpentering, bridge building, etc., all my life. At this time I am not engaged in any particular business.

2. To the second interrogatory he says: I am acquainted with the

specification and drawings of the patent granted to Mr. Norcross; and the description therein of the Hill machine, so called, is a substantially correct description of a planing machine made and used by me in Woburn, in 1827 and 1828.

3. To the third interrogatory he says: I began to make the said Hill machine in the fall of 1827. I fix the date from the following facts. I bought the factory in 1825, from my brother John, but did not move into it till April, 1826. I was engaged in making sashes, and in the course of the summer began to make soap boxes, and continued to do both during that year and the next. The planing of the boards for soap boxes was very laborious. I had previously invented a machine for sticking sashes on the principle of a rotary cutter. One day in the fall of 1827, I was watching the operation of this machine for sticking sashes, and it occurred to me that I might apply the same principle to the planing of boards. Wtthin a short time after I got up the planing machine. At first it consisted of a platform, a cylinder with a knife, and a spring to keep the board down. The rollers were added afterwards. It was made in my factory in Woburn. I used it off and on for about a year and a half. It worked well. I have stated the reasons which led me to invent it.

4. To the fourth interrogatory he says: The machine had a platform, and rested on four posts. It was about four feet long, and about two feet wide. These were made of pine wood. There was a cylinder made of satin wood, I think, about six inches in diameter, to which the knife was fastened. The knife was about twelve or fourteen inches long. There was a spring made out of a saw to keep the boards down. Then there were two iron rollers. The frame was mortised and tennoned together. The cylinder rested on boxes set into the frame, as I think. The under roller was put unto the frame. The upper roller was in a frame, a moveable frame, which might be raised or depressed by a spring. I do not know where the said machine is; the last time I saw it was in the court-house, in Boston, in a trial three or four years ago. It had all the parts which I have enumerated, when I last saw it.

5. To the fifth interrogatory he says: The boards were placed on the platform by hand, carried through by the rollers, which were grooved, and they were only planed on one side, and not reduced to an even thickness.

6. To the sixth interrogatory he says: My brother Joseph Hill knew of the making and using this machine; also Leonard Gilson; also my brothers Aaron Hill and Daniel Hill. I don't recollect any one else. I kept it pretty close. I don't know that I can state any circumstances by which I remember the date of such machine, any more than I have already done.

7. To the seventh interrogatory he says: I know not.

Answers to cross interrogatories.

1. To the first cross interrogatory he says: I was examined as a wit-

ness in the trial of a cause in the court-house, in Boston, three or four years ago; it was about the Woodworth machine. I have also given two affidavits before commissioners, one three or four years ago, and one this day.

2. To the second cross interrogatory he says: I never preserved any notes of my testimony.

3. To the third cross interrogatory he says: No one has shown me any copies of any former affidavit, statement, or testimony.

4. To the fourth cross interrogatory he says: I have not read, or heard read, any alleged copy or original draft of any former testimony of mine on this subject.

5. To the fifth cross interrogatory he says: I have not expressed myself uncertain of the said date in any testimony to my recollection.

6. To the sixth cross interrogatory he says: All the parts of the said machine, except the rollers, were invented and first seen by me in the autumn of 1827. The feeding rollers were added in the course of the winter, after my brother Joseph came to work with me, but I cannot state the exact date. I do not go by any marks, but by my memory. I did put the word "right" on the machine which was exhibited in court. The essential parts of the machine, the frame, the cylinder, and the rollers, always remained unchanged. It was repaired in some unessential particulars, in order to be brought into court. These repairs were made by my brother Joseph, but I can't state exactly when or where.

7. To the seventh cross interrogatory he says: From the first of January, 1826, to the first of January, 1829, I lived in Woburn, and worked on my own account in making sashes, blinds, and soap boxes. I do not remember that I have ever made any different statements in any former affidavit or testimony. I have talked with my brothers about the date of the invention of the Hill machine; also with Leonard Gilson; also with some lawyers.

8. To the eighth cross interrogatory he says: I have never heard that the exactness of my recollection has been called in question, or that witnesses have been called to contradict me.

9. To the ninth cross interrogatory he says: The knife was screwed on the cylinder. It had slots, so that it might be set forward or back. The knife was not set on exactly parallel to the cylinder, and the edge did not strike all at once.

10. To the tenth cross interrogatory he says: I invented and made the machine, and set it to work in the second story of the factory in Woburn. The factory was in the east part of Woburn, on the road leading o Stoneham.

11. To the eleventh cross interrogatory he says: The said machine was used in planing boards for soap boxes, and the boards planed by it were applied to that purpose. The boxes were sold in 1827 and 1828 to a man named Boynton, in Cambridgeport; to a man named Gould, in Charlestown; and to another man in Charlestown, whose name I do not recollect. It made quite a smooth and even surface. I used

the machine about a year and a half, but cannot state the exact date when it was discontinued.

12. To the twelfth cross interrogatory he says: I know the said Wm. Beers; I let him the grist mill, in the lower story of my factory in Woburn, at halves, between 1826 and 1829.

13. To the thirteenth cross interrogatory he says: I have not any memorandum or books of account, which include any work sold or done in connexion with said machine, and never had any.

15. To the fifteenth cross interrogatory he says: Leonard Gilson, and a man named Bolles, first called on me to obtain information as to said machine, some five or six years ago. Mr. Bolles afterwards, within a month or two, asked me to come down and see Mr. Giles and make an affidavit. I did examine my books thereupon, but could not find anything in them touching said machine. I made one examination, a thorough one, four or five years ago.

16. To the sixteenth cross interrogatory he says: I think I first heard of a planing machine in 1829, but I cannot say when I first heard Woodworth's name in connexion with it.

17. To the seventeenth cross interrogatory he says: I took no steps to obtain a patent for the Hill machine; I meant to have done so; but postponed it for want of means, until I heard of the other machine.

18. To the eighteenth cross interrogatory he says: I never undertook any steps to set aside Woodworth's patent, or to set up the claims of my own machine.

19. To the nineteenth cross interrogatory he says: I invented all of the said machine except the rollers, and these were devised by my brother and myself jointly. I have already stated the time as near as I can recollect.

20. To the twentieth cross interrogatory he says: I cannot answer this question any more fully than I have already done in my previous answers. I have stated all that I can remember as to the history and invention of said machine.

21. To the twenty-first cross interrogatory he says: I think Boynton of Cambridgeport, or Gould of Charlestown, was the last person to whom I sold boxes planed by this machine. I think I made no boxes after this.

22. To the twenty-second cross interrogatory he says: It was in a trial in Boston about the Woodworth machine that I last saw this machine; I have not seen it since. None of the parts were altered in shape during the trial to my knowledge.

23. To the twenty-third cross interrogatory he says: There were two rooms in the first story; one had a grist mill, and the other a carding machine and picking machine, and a bench where I worked on machinery. In the second story there was one room, used for making blinds, sashes, boxes, etc.

24. To the twenty-fourth cross interrogatory he says: I did use a wheel in said mill with planing irons on the periphery, which reduced stuff to a thickness.

25. To the twenty-fifth cross interrogatory he says: I know Elijah Wyman, and have known him these forty years. I know a man whom I suppose to be Samuel Abbot, and have known him these thirty-five years. JAMES HILL.

Deposition of Joseph Hill.

Answers of Joseph Hill to the interrogatories hereto annexed on the part of the respondents.

1. To the first interrogatory he says: I am fifty-six years old; I reside in Woburn; I am a machinist; I have been engaged in this business upwards of twenty years.

2. To the second interrogatory he says: I am acquainted with the specification and drawings of the said patent granted to Nicholas G. Norcross. I think the description therein of the Hill machine, so called, is a substantially correct description of a planing machine used, and partly made by me, in Woburn, in 1827 and 1828.

3. To the third interrogatory he says: The machine was made by myself and my brothers, James Hill and Daniel Hill. We completed it in the spring of 1828, but we had used it in 1827, when in an incomplete state. Within a year or two afterwards I saw a planing machine in Lowell, which was on the same principle, and that led me to recall the time when our own machine was made and used, and fixed the time in my memory. Our books also at that time enabled me to fix the date. The machine was made and used in East Woburn. The machine was in use between two and three years. It worked well at the last part of the time. We were engaged in making soap boxes, sashes, and other things, which required a great deal of planing, and this machine was devised as a means of saving the great amount of labor which planing by hand required.

4. To the fourth interrogatory he says: The machine was about five feet long, it rested on four posts, and the sides were united together by two girths running across. Part of the top was covered with boards running across. There was a wooden cylinder, with one cutting knife, set in it; the cylinder was about five inches in diameter, made of box wood. The cylinder was moved by a pulley on the inside of the frame. The board to be planed was kept down by a roller and springs. The action of the knife was contrary to the motion of the board. The board moved between two rollers, the lower of which was moved by a belt. The machine was of wood; there was a steel spring, and also iron bearings. The knife was about fourteen inches long, about a quarter of an inch thick, and from three to four inches wide; there were two slots cut in it, to move it back and forward, and it was fastened by bolts. This machine planed the board underneath. The last I saw of this machine was in the United States court-house in Boston, two or three years ago, and I do not know where it now is. The machine was of wood, except the rollers, (which were iron,) the knife, the steel spring, and the iron bearings.

5. To the fifth interrogatory he says: The boards were put in by hand and then fed along by the rollers themselves. It did not reduce them to a uniform thickness, but only surfaced them.

6. To the sixth interrogatory he says: Mr. Leonard Gilson worked with us as a journeyman, and he knew of the making and using of the said machine at the time. Jonas Woods also knew of the making and using it. My brother, Aaron Hill, knew of the making and using of it. I presume there were others. I remember the time because I had been to work for another man in Woburn, and I left him and went to work for my brother; this was in 1827. I think my brother had begun to work on the machine and I helped him finish it. The time was fixed in my memory from having seen the machine in operation in Lowell, as I have before stated.

7. To the seventh interrogatory he says: I know not.

Answers to the cross interrogatories.

1. To the first cross interrogatory he says: I have before testified concerning the said machine. It was on a trial in the United States court, in Boston, before Judge Woodbury. I was on the stand. I have never given a deposition. I also made an affidavit before a commissioner, about four years ago, in Boston.

2. To the second cross interrogatory he says: I have not preserved any notes of my testimony.

3. To the third cross interrogatory he says: No one has shown me any copies or minutes of my testimony, or of my affidavit.

4. To the fourth cross interrogatory he says: I have not read, or heard read, any copy or original draft of my former testimony.

5. To the fifth cross interrogatory he says: I stated, when examined, that the date when I first saw the said machine was 1827 or 1828, as nigh as I could recollect.

6. To the sixth cross interrogatory he says: To the best of my recollection the first time I ever saw the said machine, or any part of it, was late in the fall of 1827. There was then only a cylinder and a spring to keep it down, but no rollers; the boards were shoved through by hand. In the course of the ensuing winter the rollers were added, but I cannot tell exactly when. I first saw it in my brother's shop at East Woburn. The cylinder was not changed so long as I knew the machine, and the first rollers that were put on remained on so long as I knew the machine. I became so familiar with that cylinder and those rollers that I am certain they were not changed, though I cannot now tell, without seeing the machine, by what particular marks I should know it, but I should know it as well as I should know one of my brothers.

7. To the seventh cross interrogatory he says: During the year 1826, and until the autumn of 1827, I was most of the time in the employment of my brother Daniel Hill as a carpenter. I worked in Woburn and Stoneham in those years; I also did some work on my own ac-

count as a gunsmith in Woburn. In the autumn of 1827 I worked for Leonard Gilson, in Woburn, for a month or more in making sashes and blinds. In the autumn of 1827 I went into the employment of my brother, James Hill, at Woburn, in making sash and blinds, and in getting up machinery, and I remained with him till after January, 1829. The exact dates of my beginning and ending each term of service or employment I cannot give. I am not aware that I have ever made any different statements from the above in any former affidavit or testimony. I have conversed on the subject of the Hill machine with Mr. Joel Stone, Mr. Giles, and one or two other lawyers, but I do not remember any conversations about my changes of employment and places of residence.

8. To the eighth cross interrogatory he says: I do not know as to my own knowledge as to the matters inquired of in this interrogatory.

9. To the ninth cross interrogatory he says: The knife was set on by two bolts. There were slots in it so that it might be moved forward or back. It was not set on exactly parallel to the axis of the cylinder, but a little oblique, so that it did not strike square, or with the whole edge at once.

10. To the tenth cross interrogatory he says: When I first saw it there was only a frame, a cylinder, and a spring to keep it down. It was then at work upon pine stuff for soap boxes. It was on the second floor, about in the centre. The building was in Woburn, on the old road leading to Stoneham, about forty rods from what was called Evan's corner.

11. To the eleventh cross interrogatory he says: The work was put into soap boxes, which were sent into the city and sold, but I cannot say to whom. Some of the work was smooth, and some not smooth; it depended upon the sharpness of the knife. The machine was used a year and a half, perhaps longer. I cannot tell the exact date when it was discontinued.

12. To the twelfth cross interrogatory he says: I know Wm. Beers. He had no interest or partnership with me at any time between 1826 and 1829, to my knowledge.

13. To the thirteenth cross interrogatory he says: I have no such memorandum or book, and never had any to my recollection. My brother was the principal in the business.

15. To the fifteenth cross interrogatory he says: I think Mr. Joel Stone was the first who called on me to obtain information as to said machine. This was about four years ago. Soon after he called on me and went with me to Mr. Giles, who asked me some questions. I do not recollect who applied to me to testify at the trial, nor when. I have not since examined any books, memorandums, or accounts.

16. To the sixteenth cross interrogatory he says: I think I first heard of the Woodworth patent in 1829.

17. To the seventeenth cross interrogatory he says: I never took any steps to obtain a patent for the Hill machine.

18. To the eighteenth cross interrogatory he says: I have never

taken any steps whatever in opposition to the Woodworth patent, founded on the Hill machine.

19. To the nineteenth cross interrogatory he says: The only part in the said machine in which I shared in the invention was the rollers. These were the result of the mutual invention of my brother and myself; one had as much share as the other. I cannot state the exact date of such invention.

20. To the twentieth cross interrogatory he says: After I saw the machine there were no changes in it, except to add the rollers. They were added and they worked well, and required no change.

21. To the twenty-first cross-interrogatory he says: I know not.

22. To the twenty-second cross interrogatory he says: I do not know the names of the parties in the trial when I last saw the Hill machine exhibited. It was a trial involving the validity of the Woodworth patent. I have not seen the machine since. No part of the machine *were* altered during the trial, to my knowledge.

23. To the twenty-third cross interrogatory he says: There were two rooms on the first floor. One was a grist mill; the other had a carding machine in it, and was also used as a workshop, especially for any work we wanted to keep to ourselves. There was one room in the second story, which was used for making sashes and blinds and any machinery work. There was also a basement, in which we kept grindstones; and during part of the time, an engine lathe for turning iron.

24. To the twenty-fourth cross interrogatory he says: I do not know what a Bramah wheel is; we used a circular wheel plane on the second floor; it was used for bringing stuff to a thickness.

25. To the twenty-fifth cross interrogatory he says: I know Samuel Abbot and Elijah Wyman, and have known them twenty years or more.

JOSEPH HILL,

UNITED STATES OF AMERICA,
District of Massachusetts, city of Boston, ss.

On the twenty-second, the twenty-fifth, and the twenty-sixth days of March, A. D. 1851, I caused the said witnesses, James Hill and Joseph Hill, to come before me, and each witness, while present before me, I examined carefully on oath, touching the premises and in reply to the interrogatories annexed. And their answers were reduced to writing by me, and subscribed by each of the said witnesses in my presence. These depositions are taken by virtue of the commission annexed, and to be used in the cause therein mentioned, and all the directions contained in the said commission were carefully observed by me in executing the same.

GEO. S. HILLARD, *Commissioner*

Commissioner's fees, - - -	$20 00
Deponents' - - - -	3 75

UNITED STATES OF AMERICA,
Massachusetts district, ss.

[L. S.] The circuit court of the United States, within and for the Massachusetts district, to George S. Hillard, of Boston, esq'r, commissioner U. S. courts, for Massachusetts district.

Know ye, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed of Isaac Adams, of Boston, witness to be examined on behalf of the respondents, and to be used in a certain cause now pending in said court, wherein Artemas L. Brooks et al., complainants, versus John Fiske et al., respondents.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you, and each witness while present before you, to examine carefully on oath touching the premises. And when you shall have taken the examination as aforesaid, to reduce, or cause the same to be reduced, to writing, and to be subscribed by each of said witnesses in your presence. And the same, so taken and subscribed, to return, together with this commission, and your doings herein enclosed, sealed and directed to the circuit court aforesaid, to be holden at Boston, as soon as the same shall have been executed.

In testimony whereof we have caused the seal of the said circuit court to be hereunto affixed.

Witness the honorable Roger B. Taney, at Boston, this tenth day of March, in the year of our Lord one thousand eight hundred and fifty one.

ISAAC O. BARNES,
Clerk of the circuit court of the U. S., Massachusetts district.

N. B. You shall not, except by consent of the parties, in writing, permit either party to attend at the taking of the depositions, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the deponents whilst giving their depositions in answer to the interrogatories annexed to this commission. And you shall take such depositions in a place separate and apart from all other persons, and permit no person to be present during such examination, except the deponents and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the depositions to writing. And you shall put the several interrogatories and cross interrogatories to the deponents in their order, and take the answer of the deponents to each, fully and clearly.

CIRCUIT COURT OF THE UNITED STATES,
District of Massachusetts.

BROOKS and others
vs.
FISKE and another.
} In equity.

Interrogatories to be proposed to Isaac Adams, of Boston, in said district, a witness to be examined in behalf of the defendants.

1. State your age, residence, and occupation, and how long you have been engaged in your occupation, and whether you have been accustomed to examine machines and patents, with a view to their novelty and identity; and whether you have been frequently, or how otherwise, examined in patent cases as an expert.

2. Are you acquainted with the patent, and its specification and drawings, granted by the United States of America to William Woodworth, on the twenty-seventh day of December, A. D. 1828, for an improved planing machine, and with the reissued patent aforesaid, granted to William W. Woodworth, administrator of the said William Woodworth, with an amended specification, on the eighth day of July, A. D. 1845; if yea, state whether the said reissued patent describes the same invention as the said original patent, or how otherwise. Is the new patent for the same invention as the old one? State your opinion, and the reasons for the same, fully and at large.

J. GILES, *for Defendants.*

A true copy.
Attest: ISAAC O. BARNES, *Clerk.*

Cross interrogatories to Isaac Adams, propounded by plaintiffs.

1. Have you before testified, orally or in writing, as an expert in any cases founded on the letters patent to Wm. W. Woodworth, which are in controversy in this action; if so, how often, and how many affidavits have you given; whether or not your views, heretofore expressed on the subject of which you are inquired by the second interrogatory in chief, have been substantially changed or modified since your former examinations; if so, please recapitulate, as thoroughly as you can, the changes of opinion that you have undergone, and the reasons which induced the change, if any.

2. State, also, whether or not your opinion, given in answer to the second interrogatory in chief, is based simply upon your comparison of the two instruments with the drawings spoken of, or is in some measure dependent on things which you may have heard, or on sources of knowledge concerning said invention of Wm. Woodworth, which are not embraced in the original letters patent, specification, and drawings; if you answer that such is the case, please state minutely and exactly every source from whence you have obtained knowledge, of and concerning the letters patent and invention of Woodworth, and designate in detail what supposed facts you have drawn from each of such

sources, and whether any influence has been exerted on your opinion of the comparison of the two letters patent by any knowledge thus obtained.

3. State what document you have examined as the original letters patent granted to Woodworth, and its specification when you did so, and what mark or means of recognition of said documents you have affixed to them; also what you have examined as the original drawings appended to said patent, or what; if any copy thereof, or supposed copy, and what means of recognition you have affixed to any such drawings.

4. State, whether or not any, and if any, which of the devices, the combination of which is claimed with said reissued letter patent, are to be found in the drawings of the original patent; be particular in your description.

5. Answer as to the reissued letters patent, specification, and drawings, the same questions put you in the cross with regard to the originals.

6. State what invention, if any, which, claimed as new in the said reissued letters patent, you are unable to find in the drawings and specification of the original letters patent of 1828.

7. Did or not Woodworth, in his original patent, contemplate reducing a plank to an equal thickness by means of his machine?

8. Whether or not, in the drawings of said original letters patent, by you designated, you see a combinatton of devices which would reduce a plank to an equal thickness?

9. Whether or not, and if not, in what particulars were the said original specifications and drawings deficient, in designating and describing the means of effecting this object?

CHAS. LEVI WOODBURY,
Of counsel for plaintiffs.

A true copy.—Attest:

ISAAC O. BARNES, *Clerk.*

Deposition of Isaac Adams.

Answers of Isaac Adams to the interrogatories hereto annexed, on the part of the respondents.

1. To the first interrogatory he says: I am forty-eight years old; I reside in Boston; I am engaged in the business of manufacturing machinery, and have been so engaged for twenty years and upwards; I have been accustomed to examine machines and patents, with a view to their novelty and identity; I have been frequently examined in patent causes as an expert.

2. To the second interrogatory he says: I am acquainted with the patent, and its specifications and drawings, granted by the United States to Wm. Woodworth, on December 27, 1828, and also the reissued patent granted to Wm. W. Woodworth, administrator, December 8, 1845. In a copy of the reissued patent, which I have examined,

bearing the certificate of the Commissioner of Patents, dated June 4, 1846, page 5, beginning at the 14th line from the top of the page, the specification reads, "the horizontal friction rollers may be geared, and the pressure rollers placed above them to feed the board, with or without the carriage, a bed plate being used directly under the planing cylinder." This bed plate is a distinct and important instrument, placed between the two pairs of feed and pressure rollers, in the machine, as now used and described in the reissue; and it forms a combination with the lower or feed rollers for the support of the board, when acted upon by the cutter wheel, not to be found in the original specification. On page 6 of the same copy, beginning at the 20th line from the top, the specification says, "to meet the different thicknesses of the plank, or boards, the bearings of the shaft of the cylinder may be made moveable by screws, or other means, to adjust it to the work." There is nothing of this kind in the original. Moveable bearings were not new at the time of drawing the original specification; but combining them with the cutting cylinder, in the reissued specification, has essentially changed the character of the machine by making the cutting cylinder an adjustable cutting cylinder, instead of a fixed cutting cylinder, as represented in the original patent. In the same copy, page 2, beginning at the 10th line from the top, the specification says, "by geared friction rollers;" and on page 5, beginning at the fourth line, the specification says, "or by means of geared friction wheels borne up against it;" and on the seventh line of the same page the specification says, "the rollers f^1 f^1 f^1, which stand vertically, are to be made to press against the plank, and keep it close to the carriage;" and beginning in the twelfth line of the same page, it says, "they may be borne against it by means of weights or springs;" and beginning in the fourteenth line of the same page, it says, "the horizontal friction rollers may be geared, and the pressure rollers placed above them to feed the boards, with or without the carriages;" on page 7, beginning in the sixth line, the same copy says, "but in the present instance the plank is supposed to be advanced by means of one or two pairs of friction or feed rollers;" and on the same page, beginning in the eighth line, the specification says, "the uppermost f^1 f^1 of the pairs of rollers may be held down by springs or weighted levers;" and on the same page, beginning at the twelfth line, the specification says, "the lowermost of these rollers may be fluted." All these quotations from the reissued specification amount to a clear description of fluted and geared feed rollers and pressure rollers, which are not at all dependent on any yield in the material of which the rollers are constructed, but operated by distinct mechanical device, namely, a spring, or by a weighted lever. Nothing of this kind is to be found in the original patent; nor is there any thing in the original drawing or specification which indicates any design of so constructing the rollers as to give them the character of pressure rollers, by means of a yield in their own material; but if this had been the case, the two devices would be essentially different, one from the other, in principle as well as useful effect. All the discrepant matters which I have named are not included

in the summing up of the reissue patent, but the introduction of them, in my opinion, changes the machine described in the original patent from an abortive attempt to a successful and useful one; and the pressure rollers are distinctly included in the summing up, in the words found on the ninth page, to wit, "in combination with the rollers or any analogous device." * * * * "And, finally, the combination of either the tongueing or grooving cutter wheel for tongueing or grooving boards, &c., with the pressure rollers, as described." The rollers described in these quotations I understand to be the pressure rollers described in the preceding part of the specification, and there are no such rollers described in the original patent. For the above reasons, I think the new patent is not for the same invention as the old one.

Answers to the cross interrogatories.

1. To the first cross interrogatory he says: I think I have testified once on the stand, as an expert, in a case founded on the Woodworth patent. I have given one deposition, and one or two affidavits, on the same subject matter. I am not aware that my views, previously expressed, have been changed or modified.

2. To the second cross interrogatory he says: My opinion is founded simply, and, so far as I am aware, exclusively upon a comparison of authenticated copies of two letters patent.

3. To the third cross interrogatory he says: The document I have examined is a certified copy of the said original letters patent from the Patent office, and I have identified it by putting my name on the back thereof. I examined it last evening and the evening before. There are two drawings attached to, and forming part of, said document, and that which I have examined I have identified by putting my name on the back thereof.

4. To the fourth cross interrogatory he says: In the first claim of the reissued letters patent there is a claim for the use of rotating planes, in combination with rollers, the kind of rollers not being stated in that part of the specification. This I should think a sufficiently accurate claim, were the preceding parts of the reissued specification exactly, and no more, in substance what the original specification and drawing was. But as it is not, and as the devices claimed in combination, in summing up, must consist of those previously specified, including all characteristics not expressly excepted, and as pressure rollers, actuated by springs or weighted levers, are particularly described in the foregoing part of the specification, they being the only kind, too, that can be considered suitable to the object, I conclude that the rollers named in the claim in question must be regarded as pressure rollers; and if so, they are not to be found in the drawings of the original patent. There are rotating planes represented in the drawing, in combination with what may be allowed to be cutter wheels for tongueing and grooving, although the cutters which appear in the drawing are not of the proper form for the purpose. The tongueing and grooving wheels also appear

in the drawing in combination with rollers, but not with pressure rollers, as claimed in the last claim of the reissued letters patent.

5. To the fifth cross interrogatory he says: The document I have examined is a certified copy of the reissued patent from the Patent office. I have put my name upon the back of it, and also of the drawings, which are attached to and form part of it.

6. To the sixth cross interrogatory he says: I have already answered this in my second direct interrogatory.

7. To the seventh cross interrogatory he says: I think that he contemplated planing board and plank of an equal thickness.

8. To the eighth cross interrogatory he says: There is a combination of devices represented in the drawing, which would plane boards that were nearly of even thickness before planing, and leave them of even thickness after planing; but there are no devices in combination in the drawing, which could be successful in practice in reducing planks or boards, considerably uneven before planing, to an even thickness.

9. To the ninth cross interrogatory he says: They were particularly deficient in not describing pressure rollers, or some mechanical equivalent for them.

ISAAC ADAMS.

UNITED STATES OF AMERICA,
District of Massachusetts, ss. City of Boston.

On the fifth day of April, A. D. 1851, I caused the said witness, Isaac Adams, to come before me, and while present before me I examined him carefully on oath touching the premises, and in reply to the interrogatories hereto annexed; and the answers of the witness were reduced to writing by me, and subscribed by each of the said witnesses in my presence. This deposition is taken by virtue of the commission hereto annexed, and to be used in the cause therein mentioned; and all the directions contained in the said commission were carefully observed by me in executing the same.

GEORGE S. HILLARD, *Commissioner.*

Fees of the commissioner, $8 00
" " deponent, 1 25.

UNITED STATES OF AMERICA,
Massachusetts district, ss.

The circuit court of the United States, within and for the Massa-
[L. S.] chusetts district.

To George Plitt, esquire, of the city of Philadelphia, State of Pennsylvania, United States commissioner.

Know ye, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed of Robert Wolcott, of Philadelphia, State of Pennsylvania, witness to be examined on behalf of the respondents, and to be used in a

certain cause now pending in said court, wherein Artemas L. Brooks et als. are complainants, *versus* John Fiske et als., respondents.

And to this end, at certain days to be by you appointed for that purpose, to cause said witness, as aforesaid, to be brought before you, and said witness, while present before you, to examine carefully on oath touching the premises. And when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by said witness in your presence. And the same, so taken and subscribed, to return, together with this commission and your doings herein enclosed, sealed and directed to the circuit court aforesaid, to be holden at Boston, as soon as the same shall have been executed.

In testimony whereof we have caused the seal of the said circuit court to be hereunto affixed.

Witness the honorable Roger B. Taney, at Boston, this thirteenth day of March, in the year of our Lord one thousand eight hundred and fifty. ISAAC O. BARNES, *Clerk.*

N. B. You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the deposition, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the deponent whilst giving his deposition in answer to the interrogatories annexed to this commission. And you shall take such deposition in a place separate and apart from all other persons, and permit no person to be present during such examination, except the deponent and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the deposition to writing. And you shall put the several interrogatories and cross interrogatories to the deponent in their order, and to take the answer of the deponent to each, fully and clearly.

The execution of this commission appears in a certain schedule hereunto annexed.

GEORGE PLITT, *U. S. commissioner.*

PHILADELPHIA, 20*th March*, 1851.

Circuit court of the United States, Massachusetts district.

BROOKS and others
vs.
FISKE and another. } In equity.

Interrogatories to be proposed to Robert Wolcott, of Philadelphia, in the State of Pennsylvania, a witness to be examined in behalf of the defendants.

1. State your age, residence, occupation, and how long you have been engaged in your occupation.

2. Have you ever resided in the city of Baltimore, Maryland; if so, during what time; what was your business there; when did you leave Baltimore?

3. Did you see or know of any planing machine for planing boards in Baltimore; if so, describe the machine fully and exactly, and annex drawings and other representations of it, if you can; state how it operated, and what it did to the boards, and whether it reduced them to a uniform thickness; state when you first saw the machine, where it was, who made it, who owned it, who used it, how long, and how much it was used, and whether it planed well, and what became of the machine; explain fully any drawings which you may annex to your answer to this interrogatory; state who beside yourself had knowledge of the machine, and where such persons may be found, if you know.

4. Did you make any, and what parts of the machine, if any there was, yourself; if so, describe the parts made by you as accurately as you can, as the size, shape, material, and use.

5. Did you see or know of any machine for tongueing and grooving boards in Baltimore; if so, describe the machine fully and exactly, and annex drawings or other representations of it, if you can, with full explanations thereof; state when you first saw it, where it was, who made it, who owned it, who used it, how long and how much it was used, and whether it worked well, and what became of it; and if you made any part of it yourself, describe such parts as accurately as you can, and state how you remember the same.

6. State all the principal parts of the planing machine, and of the tongueing and grooving machine, which you remember, if any, and what their office was, or what they did, in the operation of the machines.

7. State what opportunities you had of becoming acquainted with the machines and their operation, and how you fix the dates or times, if any, you have named in your answers.

8. Are you acquainted with the Woodworth rotary planing machine, so called, now in use; if so, was the Baltimore machine like that, or how did it differ therefrom? State particularly.

9. Have you made, or can you make, from memory, a true model of the Baltimore machines, or either of them, and if you have made such model, have you any daguerreotype of it; if so, annex it to your answers to this interrogatory, if you have not already annexed it to a previous answer.

10. Which way, in regard to the cut, was the board fed through the planing machine?

11. Do you know, or can you set forth, any other matter or thing, which may be a benefit or advantage to the parties at issue in this cause, or either of them, or that may be material to the subject of this your examination, or the matters in question in this cause? If yea, set forth the same fully and at large in your answer.

J. GILES, *for defendants.*

And the plaintiffs, by his counsel, excepts to the competency of the witness and the relevance of the interrogatories, and declines to cross

the said interrogatories in chief before a decision had on such exceptions.

CHAS. LEVI WOODBURY, *counsel for pl'ffs.*

A true copy.

Attest, ISAAC O. BARNES, *Clerk.*

Deposition of Robert Wolcott.

Deposition of Robert Wolcott, a witness produced, sworn, and examined, on the 19th day of March, in the year of our Lord one thousand eight hundred and fifty-one, at ten o'clock in the forenoon, at the office of the clerk of the circuit court of the United States, for the eastern district of Pennsylvania, in the city of Philadelphia, by virtue of a commission issued out of the circuit court of the United States, for the Massachusetts district, to George Plitt, esquire, directed, for the examination of the said Robert Wolcott, a witness in a certain cause depending in the said circuit court for the Massachusetts district, wherein Artemas L. Brooks and others are complainants, and John Fiske and another are respondents—taken before George Plitt, a commissioner in said commission named, to wit:

1. To the first interrogatory on the part of the respondents he answers as follows: That he, the witness, is fifty-six years of age; by occupation a machinist, in which occupation he has been engaged for upwards of thirty years; and that he now resides in Philadelphia.

2. To the second interrogatory on the part of the respondents he answers as follows: That he, the witness, has resided in the city of Baltimore about seven years or upwards, from the latter part of the year 1815 until the fall of 1823. While there he carried on a shop, and followed the business of a machinist; he left Baltimore, Maryland, in the year eighteen hundred and twenty-three, in the fall of that year.

3. To the third interrogatory on the part of the respondents he answers as follows: That he, the witness, made the iron work of the machinery for planing, tongueing, and grooving flooring boards, which was used in Stewart, Hill and Company's mill, in Baltimore, on the Philadelphia road, about half a mile from the city, opposite the Columbia garden. This was in the year eighteen hundred and twenty-two, about a year before he left Baltimore. The annexed drawing (marked exhibit A) is a fac simile of the original machine used in Stewart, Hill & Co's mill in 1822 Letter C is a double S cutter for tongueing and grooving; it was thrown aside on account of the difficulty in grinding, and the single S cutter (letter B) substituted, and found to answer very well. Letter O is a planing machine, on which the board is laid flat, passing between two horizontal pressure rollers (letter W). Letter H is one of the cylinder heads, on which are bolted two cutters in a spiral position, for planing the board, cutting against the board as it passes through. Letter Y is two springs for pressing down the top roller (letter W). There are two cleats fastened on the bed to guide the board. There are two cog wheels attached to the

shafts of the pressure rollers, as shown in the drawing. On the opposite end of the shaft there is a pulley driven by a belt, as shown in the drawing. The length of this machine was about twelve feet, about three feet high, and about three feet wide. On this machine boards and planks were reduced to a uniform thickness. All the shafts and pulleys on this machine were driven by belts. He first saw the machine in 1822, in Stewart, Hill & Co's mill, in Baltimore. The cylinder cutters (letter H) being used on straw cutting machines; prior to this time (1822) he, the witness, introduced them into the planing machine, he being accustomed to making straw cutters for Robert Sinclair, of Baltimore, and Jonathan S. Eastman, of the same city, and another person, whose name he has forgotten. The wood work of this machine was made in the mill, witness does not know by whom, and he made the iron work, as before stated. The machine was owned and used by Stewart, Hill & Co., and did good work. There was no indentation shown in the board after it was planed, owing to the spiral form of the cutters.

4. To the fourth interrogatory on the part of the respondents he answers as follows: That he, the witness, has fully answered these questions in the third interrogatory on the part of the respondents.

5. To the fifth interrogatory on the part of the respondents he answers as follows: That he, the witness, knew of a machine for tongueing and grooving boards, which was also in the said mill of Stewart, Hill & Co., in Baltimore, in the year 1822. Letter T in the drawing annexed, (marked exhibit A,) is a fac simile of the machine for tongueing and grooving boards. The boards were first reduced to a proper width by circular saws. Letter A A, in the drawing of this machine, are two cog wheels on the top of two vertical rollers, between which the board passes on its edge. These two cog-wheels are driven by a worm-wheel on a horizontal shaft, working into one of the cog-wheels, (letter A,) as shown in the drawing. Letter L is a horizontal shaft, on which the S cutters are placed, directly behind the two vertical rollers. On this top shaft are two S cutters, separated by a washer between to give them the proper distance apart for cutting the rabbit on the board. Directly underneath this shaft there is a similar shaft, with one S cutter, for cutting the groove in the board. This shaft is placed under the floor of the machine, so that the point of the cutter projects through the floor, at a proper distance, to cut the groove on the bottom edge of the board. Letters O O in the drawing are two vertical rollers behind the cutters aforesaid, to receive the board as it passes from the cutters. There are two cleats on the bed of this machine to guide the board on its edge, as seen in the drawing. The shafts in this machine, and the pulleys, were driven by belts, the same as the planing machine, and as seen in the drawing. The frame of this machine is about the same dimensions as the planing machine. Both these machines were at work in the upper story of Stewart, Hill & Co's mill, in Baltimore, in 1822, and were driven by a steam engine. This mill was originally built for a saw-mill, and contained an upright saw, one circular saw, and one

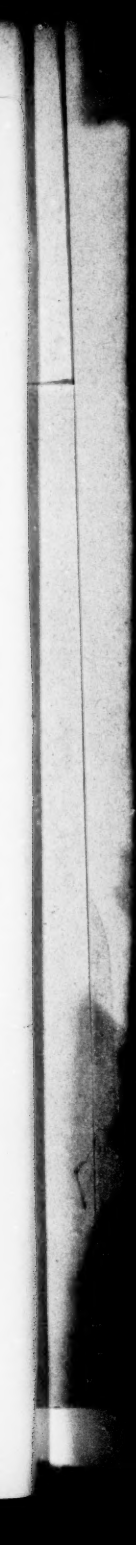
belt saw; a part of the circular saw is now in the possession of the witness. This mill, with its contents, *were* consumed by fire during the winter of 1822,–'23, the exact time he being unable to tell, as he was engaged in putting up some machinery at the Savage factory, near the city of Washington, when the mill was burnt. The wooden vertical rollers mentioned in the machine were turned by a man named Suter, who now resides in Baltimore, and may be found at his turning shop in Uhler's alley, running from Charles to Hanover streets, near Pratt street. The man who run the steam engine in the mill part of the time is still living in Baltimore, and works for Murray & Hazlehurst, near Federal Hill, Light street; his name is not remembered by witness. Mr. George Hill, the former partner of the company, is still living, and is now employed as a clerk in the United States' arsenal at Watertown, near Boston, Massachusetts. While residing in Baltimore Mr. Hill was employed as a clerk or teller in one of the banks at Baltimore, and was very seldom at the mill. Witness never saw him at the mill, and is not certain whether he was one of the firm at the time the planing and tongueing and grooving machines were in operation. He is certain, however, that the mill was built for Stewart, Hill & Co., and that it was generally known as the mill of Stewart & Hill. The active partners at the mill were Adam Stewart, Quincy Maynard, and — Griggs, all of whom are believed to be dead. He, the witness, is certain that these machines were made and put into operation prior to the year 1823, as he left Baltimore in the fall of that year; and one reason why he remembers the time more particularly is, that he has not, up to this time, received any pay for doing the work on these machines, the parties having failed, and he believes all of the partners took the benefit of the insolvent laws of the State of Maryland, and shortly afterwards left the State.

Examination adjourned until to-morrow, the 20th March, 1851, at ten o'clock, a. m.

Thursday, March 20th, 1851. Examination of Robert Wolcott resumed, at ten o'clock in the forenoon, pursuant to adjurnment

6. To the sixth interrogatory on the part of the respondents he answers as follows: That he, the witness, has fully answered this interrogatory in his answers to the third and fifth interrogatories, on the part of the respondents.

7. To the seventh interrogatory on the part of the respondents he answers as follows: That he, the witness, having made the iron work of the machines, described in his answers to the third and fifth interrogatories, of course had the best opportunities of becoming acquainted with them and their mode of operation, he being also frequently in the mill adjusting the machinery. He is certain that the date or time at which these machines were in operation at Stewart, Hill & Co's mill was prior to to the first of January, 1823, for he did no work in Baltimore city after that date, he being engaged in putting up machinery for Williams & M'Blair, at the Savage factory, near Washington. While at work in this latter place, his shop in Baltimore was



burnt, together with his books, papers, and machinery. After the fire, he sold the remains of his shop to Thomas Cooper, a grocer, living opposite, who repaired it for the use of his son, a cabinet maker. The shop was situated in North Eutaw street, near Fayette, and he thinks numbered 42 and 44.

8. To the eighth interrogatory on the part of the respondents he answers as follows: That he, the witness, has very little knowledge of the Woodworth planing machine, he never having seen one in operation. The little knowledge he has of the Woodworth rotary planing machine was obtained from persons who said they saw it at work, and which he conceives would not be evidence in this case.

9. To the ninth interrogatory on the part of the respondents he answers as follows: That he, the witness, has made several true models of the Baltimore machines for different persons, who applied to him for that purpose, and that daguerreotype likenesses were taken of the models he so made, but they are not in his possession. The drawing annexed [marked exhibit A] is an exact fac simile of the machines. The single S cutter, marked B, with the name of the witness written upon it, is the full working size of the cutters used in the Baltimore machines.

10. To the tenth interrogatory on the part of the respondents he answers as follows: That the cut was against the feed motion of the board in the Baltimore machines, but could be made to cut in the opposite direction, by crossing the belt and reversing the cutters or cylinders. The cutters for cutting the tongue and groove also cut against the feed motion of the board, and could be reversed by crossing the belt, the same as in the planing machine.

11. To the eleventh interrogatory on the part of the respondents he answers as follows: That he omitted to state, in its proper place, on his examination yesterday, that the first cutters used in the Baltimore machines were circular saws riveted together, to make the required thickness to cut the tongues and grooves, but they were found not to answer the purpose, on account of the clogging of the pitch or turpentine in the boards. The S cutters, as seen in the drawing, were substituted. He, the witness, says, that he never has been, and is not now, engaged, or has any interest in any planing machine whatever; and that he has no interest whatever in the result of the trial of this cause.

ROBERT WOLCOTT,
GEORGE PLITT,
Commissioner.

[For exhibit A, see original.]

Examination taken and reduced to writing on the nineteenth and twentieth days of March, A. D. 1851, the said witness having been sworn on the said nineteenth day of March, A. D. 1851, before

GEORGE PLITT,
U. S. commissioner.

Fees of commissioner -	$15 00
" witness and mileage -	2 70
	$17 70

GEORGE PLITT,
U. S. commissioner.

UNITED STATES OF AMERICA,
Massachusetts district, ss.

The circuit court of the United States, within and for the Massachusetts district, to George S. Hillard, of Boston, esquire, commissioner [L. S.] of the United States courts, for Massachusetts district.

Know ye, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower you to take the answers to the interrogatories hereunto annexed of George Darracott, of Salem; of George Brownwell, William A. Burke, and James B. Francis, all of Lowell; and Harvey Silver, of Chelmsford, Massachusetts, witnesses to be examined on behalf of the respondents, and to be used in a certain cause now pending in this court, wherein Artemas L. Brooks et al., complainants, versus John Fiske et al., respondents.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses as aforesaid to be brought before you, and each witness, while present before you, to examine carefully on oath touching the premises. And when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence. And the same so taken and subscribed, to return, together with this commission and your doings herein enclosed, sealed and directed to the circuit court aforesaid, to be holden at Boston, as soon as the same shall have been executed.

In testimony whereof we have caused the seal of the said circuit court to be hereunto affixed.

Witness the honorable Roger B. Taney, at Boston, this twentieth day of March, in the year of our Lord one thousand eight hundred and fifty-one.

ISAAC O. BARNES,
Clerk of the circuit court of the United States,
Massachusetts district.

N. B. You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the depositions, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the deponents whilst giving their depositions in answer to the interrogatories annexed to this commission. And you shall take such depositions in a place separate and apart from all other persons, and permit no person to be present during such examination,

1145.

except the deponents and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the depositions to writing. And you shall put the several interrogatories and cross interrogatories to the deponents in their order, and take the answer of the deponents to each, fully and clearly.

CIRCUIT COURT OF THE UNITED STATES,
Massachusetts district.

BROOKS AND OTHERS
vs. } In equity.
FISKE AND ANOTHER.

Interrogatories to be proposed to George Darracott, of Boston, George Brownell, William A. Burke, and James B. Francis, all of Lowell, and Harvey Silver, of Chelmsford.

1. State your age, residence, and occupation, and how long you have been engaged in your occupation; and whether you have been accustomed to examine and compare machines and patents with a view to their novelty and identity; and whether you have been frequently, or how otherwise, examined in patent cases as an expert?

2. Are you acquainted with the patent, and its specification and drawings, granted by the United States of America to William Woodworth, on the twenty-seventh day of December, A. D. 1828, for an improved planing machine, and with the reissue patent aforesaid, granted to William W. Woodworth, administrator of the said William Woodworth, with an amended specification, on the 8th day of July, A. D. 1845; if yea, state whether the reissued patent describes the same invention as the said original patent, or how otherwise; is the new patent for the same invention as the old one? State your opinion, and the reasons for the same, fully and at large.

3. Are you acquainted with the patent, granted in France, March 15, 1817, with an addition, March 30, 1818, to Messrs. Roguin, for a planing machine; and a patent granted in France, March 9, 1825, with an addition, April 28, 1825, to M. Manneville, for machines for grooving, planing, and reducing to an even thickness, boards, &c.; or with the descriptions of said patents and machine, published in the French work called Brevets d'Inventions, vol. 23, pages 207 to 212, plates 27 and 28, and vol. 41, pages 111 to 116, plate 12; if yea, state whether the same contain, or describe, any and what part of the invention described or set forth in the said Woodworth patent, granted the twenty-seventh day of December, A. D. 1828, or reissued July 8, 1845; state particularly what material parts and combinations, if any, are substantially the same in the said French machines, and the said Woodworth machine; how do said machines compare in their mode of operation?

4. Have said French machines, or any of them, rotating planes in combination with rollers, or any analogous device to keep the board

in place, substantially like the Woodworth machine, or how otherwise?

5. Could a mechanic, skilled in planing machines, by the aid of said French patents, make the Woodworth machine, or any, and what part thereof. without invention?

6. Are you acquainted with the patent, granted by the United States of America to Nicholas G. Norcross, one of the defendants, on the twelfth day of February, A. D. 1850, for an improved planing machine, or any model or machine made according thereto; and are you acquainted with the said reissued Woodworth patent, or any model or machine made according thereto; if yea, state whether the said Norcross machine is substantially different in structure, principle, and mode of operation, from the said Woodworth machine, or how otherwise; compare said machines together, and point out the differences in the Norcross machine from the Woodworth machine, and the advantage or beneficial effect of such differences, if any there be.

7. What device has Norcross' machine for keeping the board in place while planing; state whether the same be or be not substantially different, in structure and mode of operation, from the rollers in the Woodworth machine for the same purpose.

8. Has the Norcross machine any combination of rotating planes with rollers, or any analogous device, substantially like the Woodworth machine?

9. Has the Norcross machine either of the combinations described and claimed in the Woodworth patent of 1845?

10. What prevents the rotating planes from drawing the board out of its line of motion, and on the cutters in the two machines?

11. State whether there be a substantial difference in structure and mode of operation between the solid bench, against which the rotating planes cut, in the Norcross machine, and the pressure rollers in the Woodworth machine; and state which is the best, the bench or the roller, for cutting against, and give the reasons for your opinion.

12. State whether or not the combination of the moveable cylinder with the fixed bed B, in the Norcross machine, is substantially different in structure and mode of operation, from fixed cylinder with the pressure roller in the Woodworth machine, and give the reasons for your opinion.

A true copy. J. GILES, *for defendants.*
Attest: ISAAC O. BARNES, *Clerk.*

The cross interrogatories propounded by the plaintiffs to certain experts, witnesses for the defendants, to wit:

George Darracott, of Boston, Massachusetts; George Brownell, William A. Burke, James B. Francis, of Lowell, Massachusetts; Harvey Silver, of Chelmsford, Massachusetts.

1. Have you ever, before this, testified or given affidavits in any cause in court, or in connexion with any application for legal proceed-

ings, under the Patent law, before any person, court, or officer, in which affidavits or testimony you have given your opinions on any question of originality or novelty, or of infringement, in connexion with the Woodworth patent? If you have, state how many times you have so testified, at what dates, and whether orally or in writing.

2. Have you ever given any affidavits on such subjects as above inquired of, which were to be used *ex parte* for publication, or otherwise; if so, how many, and to whom, and at what dates, as near as you can fix them? State, also, the purpose for which you understood your testimony to have been taken in each and every of the above instances, and to whose request you testified.

3. State what document you have examined as the original patent and specification, granted to William Woodworth; when you first and when you last so examined it, and what mark or means of recognising the identity of the instrument, so examined, you affixed.

4. State what document or draft you have examined as the original drawings of the specification and patent, granted to William Woodworth, or as a copy of the same; when you first and when you last so examined it; what mark or means of recognising the identity of the drawings, so examined, you affixed.

5. State whether you have formed your opinion, in whole or in part, respecting the original patent granted to William Woodworth, from any model of the original, or from having seen said original machine, or any of them; if from a model, was it made at or before the granting of said letters patent, or since then, and by whom was it made, and what mark or means of identifying said model have you affixed thereto?

6. State whether or not any, and if any, which of the devices, the combination of which is claimed in the reissued letters patent, are to be found in said drawings; please to be particular in your description, and append a copy of said original drawings, or so mark and designate the drawings from which you testify, that they may be identified.

7. State whether or not, and if any, which of the devices, the combination of which is claimed in the reissued letters patent, were to be found in any of the original machines of said Woodworth which you saw before the year eighteen hundred and twenty-nine. Whether or not, and if any, which of the devices, the combination of which is claimed in the reissued patent, were to be found in the model of the machine by said Woodworth, filed in the Patent office, at or prior to the issue of said letters patent, or which you may have made from the original machine by said Woodworth, set in use prior to eighteen hundred and twenty-nine, or which you may have compared with and known to be an exact description of said original machines.

8. State whether or not any, or, if any, which of the devices, the combination of which is claimed in the said reissued letters patent, you are unable to find, either in the drawings, the authentic model, or the original machines, used by said Woodworth prior to the granting of

said original letters patent; and if you answer that all these means of making the comparison are not within your knowledge and command, say how much credit and value you, as an experienced expert, think ought to be attached to opinions on the reissue, made up without the knowledge or examination of the identical machine, or of all these evidences of the machine, on which the letters patent were originally granted.

9. Is not one of the purposes stated in the original patent of Woodworth to reduce to an equal thickness; and, if yea, can you point out any practical mode of reducing plank to an equal thickness by means of rotating planes, without pressure rollers or their equivalents, for making pressure on that face of the plank which is being planed; and if you can point out any such mode, do so clearly and fully; and if you can, accompany such description with a drawing or drawings.

10. Do you not find in the drawings of the Woodworth patent of 1828 the representation of rollers on each side of the planing cylinder, and on that face of the plank to be planed; and, if yea, could the machine have worked successfully on planks of varying thickness, unless the said rollers had been made self-adapting to the varying thickness of the plank? Give your reasons fully for any opinion you may express on this subject.

11. If in answer to the third direct interrogatory you shall have stated that you have read the descriptions, and examined the drawings of patents, granted in France on the 17th of March, 1817, and 30th March, 1818, to Messrs. Roguin, and also on the 9th March, 1825, with additions on the 28th April, 1825, to Mr. Manneville, state whether you have seen the original patents granted in France, or authenticated copies thereof granted by the Government of France, or whether they were copies purporting to have been extracted from a certain French work, entitled "Brevets d' Invention;" and if the latter, or translations thereof, please state if you have examined the said work, and give the date of its publication; state whether you read the French language; and whether, in testifying as to these French inventions, you have relied on your own knowledge of the French language and the examination of the said work, or on the translations. Have you any knowledge, other than the publication of the work referred to, of the dates of the said patents; and if so, what?

12. What knowledge have you of the year when said printed work, referred to in the third direct interrogatory, was published? State fully, and give the sources whence you derive this knowledge.

13. If you shall have stated that you find in the French patents of Roguin and Manneville substantially the same combination as in the Woodworth patent of July 8, 1845, state particularly whether you find said combination in any one, and which one, of the said patents, or whether, to find the said combination, you would have to refer to all, or how many, and which of them.

14. If, in answer to the fourth interrogatory in chief, you shall have stated that you find in the French patents to Roguin, of March 15,

1817, and March 30, 1818, the combination of rotating planes with rollers, or any analogous device to keep the board in place, substantially like Woodworth's, give in your answer the words of the said French patents, which describe such combination, and the letters on the drawings which designate the parts constituting such combination. Do you, or not, find in the said French patent of March 15, 1817, that the plank is to be held to and secured on to the carriage by dogs or clamps? Is not the cylinder or rotating instrument for reducing the face of the plank formed with cutting edges, cut out of a solid block of metal, and resembling what is known among mechanics as the burr-cutter, in contra distinction from planes for shaving wood; and if you find these otherwise, state fully why, and in what particular, they are otherwise. Besides the cutters, do you find in this French patent of 1817 any thing described or represented as passing or lying over the surface of the plank to be planed, other than a cross-piece marked with the letter *x*, called a guide, and if so, please state whether you find, either described or represented, any mode by which the said cross-piece or guide is either pressed down upon the surface of the plank, or made to yield to any varying thickness of the plank; do you find any such cross-piece or guide stationary or yielding on both sides of the rotating cutters, and if only on one side, could a machine for planing answer a good practical purpose with only one? If in the patent of March 30, 1818, you find rotating planes, do you find these combined with a pressure roller, or its equivalent; and if so, point out the letters by which it is designated in the drawings. If, instead of a roller, you find a cross-piece or guide, as in the patent of 1817, please state whether you find, either from the description or drawing, that this said cross-piece or guide is made self-adapting to the varying thickness of the plank; and if so, point out the same in the description and drawings. Is not the said cross-piece or guide represented as permanently attached to the same carriage with the planing cylinder, which carriage moves on the frame from end to end of the plank that rests on the main frame, and is it not stated in the said specification that the carriage, which carries the planing cylinder and guide, is to weigh about 200 pounds? If yea, could, in your opinion, a practical working machine be made on this plan? Would such a weight be sufficient to hold down the planing cylinder? The planing cylinder and guide being connected together in the same moveable carriage, would not the two, if they yielded at all, yield together, and thus plane the plank to a varying instead of an equal thickness?

15. If, in answer to the fourth interrogatory in chief, you shall have stated that in the French patent of Manneville, granted March 9, 1825, and the additions thereto, granted April 28, 1825, you find the combination of a planing cylinder with pressure rollers, or their equivalents, point out the parts of the description and drawings relating to such combination. Is it not stated in said Manneville's first patent that the plank to be tongued and grooved is to be securely adjusted on a carriage, and if you shall have stated that you find in the said patent

a pressure roller, is not such a roller to be used in connexion with some plan of securing the plank to the carriage? Specify particularly in what manner this roller is to be applied, and whether, in your opinion, such mode of application is practicable; and if so, why it is practicable. In your opinion, could a machine be made practically useful with only one such pressure roller, unless in connexion with it some plan was adopted for securing the plank to the carriage? Is the mode of tongueing and grooving plank, in said patent, by means of one cutter wheel on each side, or by means of circular saws, five saws being used for the tongue and three for the groove, together with reciprocating cutters for finishing the groove? If, in your opinion, this mode of tongueing and grooving planks is substantially similar to Woodworth's plan, give your reasons fully for such opinion.

16. In your opinion, would the mode of applying the roller, described in said Manneville's patent, prevent the plank from moving laterally whilst being tongued and grooved; and if yea, point out what is described or represented for promoting the lateral vibration of the plank.

17. Can you understand every part of the description of the said Manneville's patent? And if so, describe the mode of construction referred to in that part of said patent, in which he states that he has endorsed the entire mechanism in a cylinder of 18 inches.

18. In the description in said patent of the mode of planing planks, are the fluted pressure and feed rollers applied to the faces or edges of the plank; and if the latter, is it not stated that the plank is to be placed on rollers that have their axis horizontal, and that the two fluted rollers are vertical and parallel? Such being the position of the parts, are, or are not, the fluted rollers applied to the edges of the plank?

19. Do you understand the construction and mode of operation of the planes for planing the surface or surfaces of the plank described in said Manneville's patent; and if yea, describe the same minutely; and if you can, accompany your description with a drawing or drawings, and do this without the exercise of any knowledge of planing machines, derived from other sources.

20. Do you find in the said patents of Manneville, or either of them, the combination of rotating planes with pressure rollers for planing planks and reducing them to an equal thickness; and if yea, point out the said combination in the description. Is there any drawing of the planing machine described in the said Manneville's patents.

21. Does or not the addition of the said Manneville, bearing date the 28th of April, 1825, apply solely to a mode of feeding or moving the plank by means of an endless chain of links, to which the planks are secured by dogs and bolts, and to a modification of the roller for taking the warps out of the plank? Do or not the dogs and bolts, or either of them, for securing the planks to the links of the chain, project above the surface of the plank? Is not the roller grooved for the purpose of admitting of the passage of such projecting bolts; and if yea, how could such mode be applied when planing the surface of the plank, without destroying the cutting edges of the planes?

22. If in answer to the fifth interrogatory in chief you shall have stated that a mechanic, skilled in planing machines, could without invention construct the Woodworth machine, please state from which of the said French patents, and whether, in your opinion, this could be done by a mechanic, having no more skill or knowledge of planing than was known at the time the said inventions purport to have been made.

23. Whether or not, in the Norcross machine, when the plank is being planed and reduced by the action of the cutters on one of its sides, the other side is held firmly against a plate, bed, or rest, to prevent vibration taking place whilst under the action of the knife, and to secure the reduction of the board to an equal thickness.

24. Whether or not, in the machine, when the plank is being planed and reduced on one side by the action of the cutters, the other side of the plank is held firmly against a solid bed or rest to prevent vibration taking place whilst under the action of the knife, and to secure the reduction of the board to an equal thickness.

25. Whether or not, both in the Woodworth and in the Norcross machines, there are rotary cutters to plane the board, and some mode of keeping the plank in contact with the rest to reduce it to an equal thickness.

26. Whether or not in such machine the board is by the rotary cutters reduced to an equal thickness at the same time that it is planed; and if not, how otherwise.

27. What substantial difference, in the process by which the board is planed and reduced to an equal thickness, exist in the two machines?

28. What substantial difference, if any, exists in the result of the two machines, and whether that difference, if any, is a change in principle; and if so, of what principle of the Woodworth machine, and how is that principle changed?

29. State whether or not the mechanical devices in the Norcross machine affect any new and useful change in the operation of planing boards; if so, what is the new principle that is by said Norcross machine introduced into the art of planing boards, which was before unknown.

30–31. Whether the mechanical devices in the Norcross machine supersedes the necessity of feeding the boards to the cutter; of holding the board firm against a bed or rest whilst its opposite side is being planed; of preventing the board from being drawn towards the axis of the cutters by the operation of planing; of planing and reducing to an equal thickness by the same operation; of arranging the machines to admit boards of varying thickness to be fed to the cutter; of adjusting the periphery of the cutter at a fixed distance from the bed or rest, which is on the opposite of the plank or board, to determine the exact thickness that shall be left after being planed; of having the surfaces, between which the plank passes, vary in their distance from each other to accommodate the varying thickness of the plank, whilst the cutting cylinder and the rest opposite to it remain at the same distance apart; of having this varying distance of surfaces self-adapting by pressure, to keep one face of the plank against the rest?

32. If you have answered at any time to any questions respecting the principles of the plaintiff's or defendant's machines, please state carefully what definition you attach to the term "principle" of a machine, and whether you understand the use of analogous devices or mechanical equivalent in a machine, to change the principles of such machine.

33. What have been your means of acquiring an expert knowledge of mechanics, and how much time have you spent in acquiring such knowledge; how long have you been an expert, and how often have you before testified as an expert; how many years were you a practical mechanic, and in what branch of mechanics were you practically engaged?

34. Have you ever examined any machine which you regarded as an infringement on the Woodworth patent?

35. What do you regard as the principles embodied in the machine described in the present Woodworth patent?

36. What do you regard as the mode of operation of the machine described in the present Woodworth patent?

37. Do you consider the mere inventing of a machine to constitute a change of principle or mode of operation; do you or not consider the substitution of weighted or yielding bars or plates for the pressure rollers in the Woodworth machine, to constitute an essential change in the principle or mode of operation of the Woodworth machine?

38. Would it constitute an entire change in the principle or mode of operation of the Woodworth machine to connect the bed and rotating planes in a separate frame, and have the pressure rollers stationary, and instead of pressing the plank against the bed, press the bed up against the plank, the bed and rest always retaining the same relative positions?

39. If you shall have stated, in answer to the preceding cross interrogatory, that the change therein suggested would not constitute an entire or essential change of principle or mode of operation, please state in what particular the machine so changed would differ in any, and in what essential respect, from the Norcross machine.

40. Are you engaged as counsel or attorney for the defendants, or either of them, in this present cause, or in any suit, present or future, or for any party using or owning any planing machine or machines, and what particular machinery, and, if yea, is your compensation contingent on the success of such party, or on the defeat of the Woodworth patent?

41. Have you or not been employed or consulted as attorney, counsel, or adviser, by Nicholas G. Norcross, on any question of infringement between the Norcross machine and the Woodworth patent; and, if yea, is your compensation for such service contingent or otherwise?

A true copy.

Attest: ISAAC O. BARNES, *Clerk.*

Deposition of James B. Francis.

Answers of James B. Francis to the interrogatories hereto annexed on the part of the respondents.

1. To the first interrogatory he says: I reside in Lowell; I am thirty-six years old; I am a civil engineer, and have been so from boyhood; I have examined numerous machines, but have seldom examined patents minutely with a view to their novelty and identity; I have never been examined as an expert in patent causes.

2. To the second interrogatory he says: I am acquainted with the original patent and drawings, and specifications, granted to Wm. Woodworth, Dec. 27, 1828, for an improved planing machine, and also with the reissue granted to W. W. Woodworth, adm., July 8, 1845. The claim in the first patent to Woodworth is so vague and indefinite, that with my limited experience in patents, I cannot say what it would legally include. The claim in the reissue is definite. All I can say is, that the invention claimed in the reissue would not be suggested to my mind as being the invention claimed in the original patent. I cannot give any reason for this opinion, other than that is the result produced in my mind by an examination of the two sets of specifications and drawings.

3. To the third interrogatory he says: I am not sufficiently acquainted with the French patents named to answer this interrogatory.

4. To the fourth interrogatory he says: I know not.

5. To the fifth interrogatory he says: I know not.

6. To the sixth interrogatory he says: I have read the specifications attached to the Norcross patent, and to the reissued Woodworth patent, and have examined machines made under said patents. I am acquainted with the two machines, principally by the examination of the machines constructed under the two patents, which I have seen running at Lowell, and I am of opinion that the Norcross machine is substantially different in structure, principle, and mode of operation from the Woodworth machine

In the Woodworth machine, the plank or board to be planed is interposed between the revolving cutters and the bench, the action of the cutters being such as to tend to draw the board away from the bench, and rendering necessary pressure rollers or some analogous device, to keep the board in its place and prevent its being drawn into the cutter. In the Norcross machine, the tendency of the action of the cutters is to draw down the board on to the bench, rendering pressure rollers or any analogous device unnecessary for the purposes of preventing the board being drawn into the cutters, that result being perfectly accomplished by the resistance offered by that part of the bench close to the revolving cutters.

In the Woodworth machine, the distance between the periphery of the revolving cutters and the top of the bench determines the thickness to which the board will be planed, the axis of the revolving cutters being placed at a fixed height above the top of the bench, and the board

being drawn along, with its under side in contact with the bench against which it is forced by the pressure rollers. The revolving cutters plane off the board, leaving it reduced to an even thickness, which thickness is equivalent to the distance between the periphery of the revolving cutters and top of the bench.

In the Norcross machine, the planing of the board to a uniform thickness is accomplished in an entirely different manner. The axis of the revolving cutters is placed below the bench, the periphery of the cutters projecting above the bench a distance equivalent to the thickness that is to be planed off the board. Above the cutters is placed a rest, connected with the revolving cutters by a rigid frame, which can move vertically in slides sufficiently to allow boards, which are of different thicknesses before they are planed, to pass through. The height between this rest and the periphery of the revolving cutters is invariable, and determines the thickness to which the board will be planed. The height between the top of the bench and the under side of the rest is variable, and always equal to the thickness of the board before it is planed. The rest, together with the frame and revolving cutters, and any additional weights that are found necessary, can rise and fall to a small extent, equal to the variation in the thickness of the board before it is planed. The whole weight of the rest, frame, revolving cutters, and additional weights presses directly on the board, which is thereby pressed down on to the bench, the effect being to hold the board firmly between the rest and the bench, at the same time that it is advancing towards the revolving cutter.

I am of opinion that these variations constitute essential differences in the two machines. In the Woodworth machine, the action of the revolving cutters is against pressure rollers, placed necessarily at a considerable distance from the cutting point.

In the Norcross machine, the action of the cutters is against the solid bench, which resists the action of the cutters at a point very much nearer the cutting point than is practicable in the Woodworth machine, the result being that the board is held much firmer and is more free from vibration at the part on which the cutter is acting in the Norcross machine, than it can be in the Woodworth machine; and, I consider this ability to hold the board firmly close to the cutting point, as a most important difference in the two machines, and one that, in the planing of thin boards, will give the Norcross machine a distinct superiority over that of Woodworth.

7. To the seventh interrogatory he says: I have answered this interrogatory fully in my answer to the sixth interrogatory.

8. To the eighth interrogatory he says: The Norcross machine has not any combination of rotating planes with rollers, or any analogous device substantially like the Woodworth machine.

9. To the ninth interrogatory he says: The Norcross machine has not either of the combinations described and explained in the Woodworth patent of 1845.

10. To the tenth interrogatory he says: In the Woodworth machine, the pressure rollers; in the Norcross machine, the bench.

11. To the eleventh interrogatory he says: There is a substantial difference in structure and mode of operation between the solid bench in the Norcross machine and the pressure rollers in the Woodworth machine; and I think the bench is the best for cutting against, for the reason set forth in my answer to the sixth interrogatory.

12. To the twelfth interrogatory he says: The combination of the moveable cylinder with the fixed bed B, in the Norcross machine, is substantially different in structure and mode of operation from the fixed cylinder with the pressure roller in the Woodworth machine, for the reasons set forth in my answer to the sixth interrogatory.

Answers to the cross interrogatories.

1. To the first cross interrogatory he says: I gave an affidavit on March 1, 1850, before E. F. Sherman, esq., in Lowell, relating to the Woodworth and Norcross planing machines, in which I gave an opinion in favor of the novelty and superiority of the latter machine.

2. To the second cross interrogatory he says: I have only given the affidavit referred to in my answer to the first cross interrogatory. I understood it was to be used in relation to an injunction. It was given at the request of Nicholas G. Norcross.

3. To the third cross.interrogatory he says: The only document that I, to the best of my recollection, have examined, as the original patent and specification granted to William Woodworth, purports to be a certified copy under the seal of the Patent office. I first examined it, to the best of my recollection, about fifteen days ago, and it is now before me, and I have identified it by writing my name on the back of it.

4. To the fourth cross interrogatory he says: The drawings are a part of the document referred to in my answer to the third cross interrogatory, and are attached to the same by a string and seal. The drawing of the planing machine I have marked by writing my name on the back of it.

5. To the 5th cross interrogatory he says: I have formed my opinion entirely from the specifications and drawings referred to in my answers to the third and fourth cross interrogatories. I have never seen the original machine, or any model thereof.

6. To the sixth cross interrogatory he says: I understand the interrogatory to be confined to the inventions for planing. The claim in the reissued patent is for the employment of rotating planes, in combination with rollers or any analogous device, to prevent the boards from being drawn up by the planes when cutting upwards. In the drawing of the planing machine referred to in the answer to the 4th cross interrogatory, there is represented a cutting cylinder in combination with rollers, having some resemblance to pressure rollers; but whether the devices there represented legally include the claim in the reissued patent, my experience in patent cases is too limited to speak with confidence.

7. To the seventh cross interrogatory he says: I never saw any of the machines, or the model, referred to in this interrogatory.

8. To the eighth cross interrogatory he says: The claim in the reissued patent being as I have stated in my answer to the 6th cross interrogatory, I find that there is represented in the drawings attached to Woodworth's original patent (which I have marked and referred to in my answer to the 4th cross interrogatory) a cutting cylinder in combination with rollers, the whole bearing a resemblance to the combination claimed in the reissued patent; but whether they both have the same legal signification, my experience in patent cases is too limited to allow me to state definitely. I consequently cannot state definitely what there is in the claim of the reissued patent that I am unable to find in the drawings attached to the original patent above referred to.

I have not seen the authentic model or the original machine, but I have seen the drawing. As I have not undertaken to express an opinion upon the propriety of the reissue, I do not think it necessary to make answer to the latter part of this interrogatory.

9. To the ninth cross interrogatory he says: One of the purposes of the original patent I understand to be to reduce boards to an equal thickness. I do not know any other modes of reducing boards to a thickness than those stated in the interrogatory.

10. To the tenth cross interrogatory he says: I do find in the drawings of the original Woodworth patent a representation of rollers on each side of the planing cylinder, and on that face of the plank to be planed, and do not see that the machine could have operated successfully on planks of varying thickness unless these rollers had been made self-adapting to the varying thickness of the plank. This is so plain a thing to any mechanic, that I can give no reasons that will strengthen the above conclusion.

11 to 22. To the various cross interrogatories, from the eleventh to the twenty-second inclusive, he says: I know not.

23. To the twenty-third cross interrogatory he says: I answer this question in the affirmative. Such is the effect and operation of Norcross' machine.

24. To the twenty-fourth cross interrogatory he says: I answer this question also in the affirmative. Such is the effect and operation of Norcross' machine.

25. To the twenty-fifth cross interrogatory he says: In both machines there are rotary cutters, and some mode of keeping the plank in contact with the rest to reduce it to an equal thickness.

26. To the twenty-sixth cross interrogatory he says: In both machines the board is by the rotary cutters reduced to an equal thickness at the same time that it is planed.

27. To the twenty-seventh cross interrogatory he says: I cannot answer this question more fully than I have already done in my answer to the sixth direct interrogatory, and I refer to that by way of answer hereto.

28. To the twenty-eighth cross interrogatory he says: The substantial difference in the results of the two machines I consider to be, that in the Norcross machine the board is held firmer and in a manner more

certain to prevent vibration than is possible in the Woodworth machine; and that the different principle involved is, that in the Norcross machine the cutters act against a flat and solid bench close to the cutting point, whereas in the Woodworth machine they act against cylindrical rollers, necessarily placed at a much greater distance from the cutting point than in the Norcross machine.

29. To the twenty-ninth cross interrogatory he says: I do not profess to be acquainted with all the devices ever invented for planing boards; I cannot therefore state what is new in the principle of the Norcross machine. In the answer to the twenty-eighth cross interrogatory, I have stated wherein it differs in principle from the Woodworth machine.

30. To the thirtieth cross interrogatory he says: The mechanical devices in the Norcross machine do not supersede the necessity of any of the operations named in this interrogatory.

32. To thirty-second cross interrogatory he says: I consider that one machine differs from another in principle if it can produce a different effect, and one that is not possible in the other, or any modification thereof not effecting its principle; although I admit the possibility of two machines being different in principle, and yet accomplishing only the same result. I should consider that any thing changing the principle of a machine was not an analogous device or mechanical equivalent.

33. To the thirty-third cross interrogatory he says: My means of acquiring an expert knowledge of mechanics have been mainly through the necessities of my situation as civil engineer at Lowell, which I have occupied for about sixteen years. I have never given but one affidavit, as before mentioned. I have never been a practical mechanic.

34. To the thirty-fourth cross interrogatory he says: My particular attention has been called only to the Woodworth and Norcross planing machines. I am not aware that I have seen any machine infringing on the Woodworth patent.

35. To the thirty-fifth cross interrogatory he says: I consider the principles embodied in the present Woodworth patent (as confined to planing) to be, the combination of revolving cutters with pressure rollers, the effect of said pressure rollers being to prevent the board being drawn out of its line of motion towards the centre of the cutters, when they cut from the planed upwards towards the unplaned surface.

36. To the thirty-sixth cross interrogatory he says: I regard the mode of operation of the machine described in the present Woodworth patent (as confined to planing) to be, the planing of boards by revolving cutters and reducing them to a uniform thickness, which is insured by holding them down on to a solid bench, by means of pressure rollers.

37. To the thirty-seventh cross interrogatory he says: I do not consider that the mere inverting of a machine would constitute a change of principle or mode of operation, unless there necessarily accompanied said inversion a new effect, which could not be produced by the same machine without said inversion.

I should consider that the substitution of weighted or yielding bars or plates, for the pressure rollers in the Woodworth machine, would not constitute an essential change in the principle or mode of operation of the Woodworth machine, unless by the substitution some new and beneficial effect was produced.

38. To the thirty-eighth cross interrogatory he says: I have given my best attention to this interrogatory, and I cannot comprehend the meaning of it, when taken in connexion with the two last lines of the interrogatory, which are as follows, "the bed and rest always retaining the same relative positions."

39. To the thirty-ninth cross interrogatory he says: As I have not been able to comprehend the thirty-eighth cross interrogatory, I cannot answer this.

40. To the fortieth cross interrogatory he says: I am not of counsel or attorney for the defendants, or either of them, in this or any other cause, nor for any party using or owning any planing machine.

41. To the forty-first cross interrogatory he says: I have not been employed or consulted by said Norcross as counsel, attorney, or adviser, on any question concerning his machine.

JAMES B. FRANCIS.

Deposition of William A. Burke.

Answers of William A. Burke to the interrogatories hereto annexed, on the part of the respondents.

1. To the first interrogatory he says: I am thirty-nine years old. I reside in Lowell; I am a machinist; I have been engaged in that occupation for twenty-three years, and am now employed as superintendent of the Lowell machine shop. I have not been frequently called upon to examine machines and patents with a view to their novelty and identity, but have done so in one or two instances.. I have been examined as an expert in one patent case.

2. To the second interrogatory he says: I have seen and examined the specification and drawings granted to William Woodworth, in 1828, for an improved planing machine; also the reissued patent granted to William W. Woodworth, adm., with an amended specification, July 8, 1845. I consider that the patent of 1845 contains new elements in the description and drawings, and in the claims, which in my opinion constitute a different invention from the one for which a patent was granted in 1828. In the patent of 1828, there is no description of pressure rolls or claims set up for their use, although in the drawing rolls are represented as being in front of the carriage upon which the piece to be planed is fixed; while in the patent of 1845, the rolls are shown as in the patent of 1828, and are fully described as being pressure rolls, and are claimed in combination with the rotating cutting cylinder, as being necessary to prevent the board while planing from being drawn towards the centre of the cutting cylinder. In the patent of 1828, the carriage is described and shown as being moved by a rack,

while in the patent of 1845 there is not only a description of the carriage, but there is also a description and representation of a machine, by which continuous motion is given to the piece being planed, by means of feed rollers, a mode of carrying or moving the board which is not suggested or described in the patent of 1828. For these reasons, I consider that the patent of 1845 contains new and different elements in the construction of the planing machine, from that patented in 1828.

3. To the third interrogatory he says: I am not sufficiently acquainted with the said patents to testify concerning them.

4. To the fourth interrogatory he says: I know not.

5. To the fifth interrogatory he says: I know not.

6. To the sixth interrogatory he says: I am acquainted with the patent granted to N. G. Norcross for an improved planing machine, and have seen a planing machine made according thereto in operation at Lowell, and have also seen planing machines in operation made according to the re-issued Woodworth patent. I consider the Norcross machine to be essentially different in the structure or combination of its different parts, and in its mode of operation, from the Woodworth machine. In the Woodworth machine, the board or piece to be planed being placed on a firm unyielding bench, is carried forward by feed rollers, under a pressure roller, and thence onward under a rotating cutting cylinder, which cylinder being adjusted on its bearings at the proper distance above the bench, reduces the board to the required thickness. After the board passes the cutting cylinder, it then is carried under a second pressure roller, which presses upon the top or planed surface of the board. These pressure rollers act or lie upon the same side or surface of the piece planed, as the rotating cutter, and as the cutter cylinder cuts from the planed towards the unplaned surface of the board, these pressure rolls, or some analogous device, is necessary to prevent the lifting of the board from the bench while being planed. As the pressure rollers cannot be brought within say eight inches of each other at their bearing points upon the board, the contact of the board with the bench for that distance must depend entirely upon its stiffness, so that in thin boards there must be great difficulty in holding them down to the bench and preventing such a vibration upwards as would destroy the evenness of the surface planed.

In the Norcross machine, the board or piece to be planed is placed upon a bench and is carried forward by feed rollers, thence under a rest and over a rotating cutting cylinder, which reduces the board to the required thickness. The rest is connected firmly, so far as relates to the distance apart, which distance determines the thickness to which the piece is to be reduced, with the cutting cylinder, and is placed directly over it. The rest and cutting cylinder being connected together as described, are at liberty to move up or down so as to adapt their position to the unequal thickness of the board, as it passes over the bench before being planed. As the board is placed with the surface to be planed lying on the bench, and the cutting cylinder cuts from the planed towards the unplaned surface, the tendency of the action of the

cutter is to draw the board more firmly towards the bench and prevent vibration to it while being planed, this steadiness of the board being also assisted by the weight of the cutting cylinder and rest, which hangs on the board, as it were, while it is passing over the end of the bench in its progress towards and over the cutting cylinder. The rest, having a concave surface, by its weight with that of the cylinder, has the effect of giving to the board while being planed a curve in the direction of the circumference of the cylinder, which must have a beneficial effect in preventing the loosening of knots in the tearing out of the fibres in open grained wood while acted upon by the cutter.

The difference between the two machines I consider to be, that Norcross places the piece to be planed upon the bench, with the surface to be planed in contact with the bench; that he dispenses entirely with the use of pressure rollers, and instead thereof makes use of the weight of the cutting cylinder combined with the rest as I have described, for the purpose of holding the piece, while being planed, in a firm and steady manner.

In the Woodworth machine, the board to be planed is placed with the surface to be planed uppermost, and both the pressure of the pressure rolls and the cutting of the cylinder takes place upon the surface of the board which does not lie upon the bench. By this arrangement, pressure rolls or some analogous device become necessary to prevent the board from being drawn up from the bench towards the axis of the cutting cylinder.

I consider that by the arrangement and curved form of the rest over the cylinder in the Norcross machine, a better surface will be given to the board, and also that much thinner boards can be planed than can be done in the Woodworth machine. I am also of opinion that the Norcross machine will do the work more expeditiously than the Woodworth machine, and also, from the simplicity of its construction, will not be so liable to stoppage or repairs, as may be the case in the Woodworth machine.

7. To the seventh interrogatory he says: In the Norcross machine, the board is kept in place by the weight of the rest and cylinder, which causes it to lie firmly on the end of the bench, just before it passes over the cutting cylinder; while in the Woodworth machine, a pressure roll is necessary on each side of the cutting cylinder, to prevent the board being drawn up from the bench towards the axis of the cylinder.

8. To the eighth interrogatory he says: The Norcross machine has not any combination of rotating planes with rollers, or any analogous device substantially like the Woodworth machine.

9. To the ninth interrogatory he says: I do not consider that the Norcross machine has either of the combinations described and claimed in the Woodworth patent of 1845.

10. To the tenth interrogatory he says: In the Norcross machine, it is the pressure or weight of the combined cutting cylinder and rest, holding the board firmly to the bench. In the Woodworth machine,

it is the pressure rollers which bear upon the upper surface of the board, keeping it in contact with the bench.

11. To the eleventh interrogatory he says: I think there is a substantial difference in the two modes, and in my opinion the mode used by Norcross, of cutting against or towards the bench, is preferable to the mode used in the Woodworth machine of cutting from the bench and towards the pressure rollers, because the Norcross mode keeps the board, while planing, firmer and with less vibration, than is or can be the case in the Woodworth mode.

12. To the twelfth interrogatory he says: I consider the combinations of the cutting cylinder with bench different in the two machines, because in the Woodworth machine the cylinder is permanently fixed as to distance to the bench, thereby determining the thickness to which the board shall be reduced, and the board passing under the cutting cylinder, and over the bench, requires the pressure rolls or some analogous device to keep the board in contact with the bench; but in the Norcross machine, the cutting cylinder has no fixed or permanent connexion with the bench, but is free to move up or down as required by the varying thickness of the unplaned board, and does not require the use of, and has not, pressure rolls to keep the board firmly in its position on the bench.

Answers to the cross interrogatories.

1. To the first cross interrogatory he says: I gave an affidavit in favor of the originality and novelty of the Norcross machine in Lowell, before S. W. Stickney, notary public, March 1, 1850. This is the only one I have ever given on the subject.

2. To the second cross interrogatory he says: I understood that my affidavit was to be used before the court upon the question of injunction between Norcross and the proprietors of the Woodworth patent. It was not given for publication; I never gave but one; it was given at the request of Mr. Norcross.

3. To the third cross interrogatory he says: The said document purports to be an office copy, from the Patent office, of the original patent to Wm. Woodworth, in 1828. I first saw this document, or one like it, about a year ago, and I have it now before me. I have identified it by putting my name upon the back.

4. To the fourth cross interrogatory he says: Attached to, and forming a part of, the document referred to in my answer to the third cross interrogatory, are two drawings, one of them representing a planing machine, and this is the drawing to which I refer, and I have identified it by putting my name upon the back of it.

5. To the fifth cross interrogatory he says: I have not formed my opinion from any model, or from having seen the said original machine.

6. To the sixth cross interrogatory he says: I find, in the said drawing, a combination of a cutting cylinder with rollers, which claim to be pressure rollers, marked *f f*, but whether these rollers are to be consid-

ered as pressure rollers is somewhat doubtful from the drawing, and there is no description of them in the specification.

7. To the seventh cross interrogatory he says: I have no knowledge of the said original machines, or the said model.

8. To the eighth cross interrogatory he says: The answer to this question depends upon the fact whether the rollers *f f*, are to be considered as pressure rollers. I do not myself consider them to be such pressure rollers as are described in the reissued letters patent. My means of testifying are drawn from the specification and drawings of the original patent.

9. To the ninth cross interrogatory he says: It is one of the purposes stated in the original patent of Woodworth to reduce plank to an equal thickness, and this cannot be done without some contrivance for producing a pressure on the plank.

10. To the tenth cross interrogatory he says: I do find in the drawing of the Woodworth patent of 1828, the representation of rollers on each side of the planing cylinder, and on that side of the plank to be planed. The machine could not have worked successfully on plank of varying thickness, unless the one which bore on the unplaned part of the plank, at least, had been made yielding to the varying thickness, because, otherwise, the varying thickness of the plank would have produced an obstruction, which would have stopped the action of the machine, or broken some of its parts.

11 to 22. To the several cross interrogatories from the eleventh to the twenty-second, inclusive, he says: I know not.

23. To the twenty-third cross interrogatory he says: I answer this question in the affirmative. This is a correct description of the action of the Norcross machine.

24. To the twenty-fourth cross interrogatory he says: I also answer this question in the affirmative. Such is the operation of the machine.

25. To the twenty-fifth cross interrogatory he says: In both the machines there are rotary cutters to plane the board, and some mode of keeping the plank in contact with the rest, to reduce it to an equal thickness.

26. To the twenty-sixth cross interrogatory he says: In these machines the board is, by the rotary cutters, reduced to an equal thickness at the same time that it is planed.

27. To the twenty-seventh cross interrogatory he says: I have answered this question as fully as I can in my answer to the sixth direct interrogatory.

28. To the twenty-eighth cross interrogatory he says: The Norcross machine works more expeditiously, and with equal care; cuts a better surface. There is a change in principle in the method of holding the board while they are being planed, and that principle is changed by substituting the weight of the cutting cylinder with the rest attached to it for the pressure rollers.

29. To the twenty-ninth cross interrogatory he says: The said mechanical devices do effect a change, as set forth in my answer to the 6th

direct interrogatory. The principle of holding the board in the Norcross machine was never known before to my knowledge.

30. To the thirtieth cross interrogatory he says: In Norcross' machine it is not necessary to prevent the board from being drawn towards the axis of the cutters by the operation of planing, as that is not the tendency of the machine. The mechanical devices in the said machine do not supersede the necessity of any other of the processes named in the interrogatory.

[See the end of the deposition.]

32. To the thirty-second cross interrogatory he says: I understand by the principle of a machine the particular combination which produces the specific result of the machine. The answer to the last part of the interrogatory depends upon the meaning to be attached to the expression, "analogous devices or mechanical equivalents." As I understand them, their substitution would not change the principle of a machine.

33. To the thirty-third cross interrogatory he says: I have been for twenty-three years employed as a machinist, working myself, or superintending the labors of others. I don't know how long I have been an expert. I have testified in one patent case, and given one affidavit. I have always been more or less of a practical mechanic. I have been principally engaged in the making of cotton machinery.

34. To the thirty-fourth cross interrogatory he says: I have no recollection of having ever examined such a machine.

35. To the thirty-fifth cross interrogatory he says: The principles embodied in the present Woodworth patent I hold to be the holding of the boards by pressure roll, and the reducing them to a thickness by rotary cutters.

36. To the thirty-sixth cross interrogatory he says: I have fully answered this question in my reply to the 6th direct interrogatory.

37. To the thirty-seventh cross interrogatory he says: I should not think that the inventing of a machine, with no other change, would constitute a change of principle or mode of operation. The substitution of weighted or yielding bars or plates for pressure rollers in Woodworth's machine would not constitute an essential change in the principle or mode of operation if the cutting cylinder and bench remained in their present relative positions.

38. To the thirty-eighth cross interrogatory he says: I do not understand this interrogatory.

39. To the thirty-ninth cross interrogatory he says: I know not.

40. To the fortieth cross interrogatory he says: I am not engaged as counsel or attorney for the defendants, or either of them, in this or any other cause, or for any party using or owning any planing machine.

41. To the forty-first cross interrogatory he says: I have not been employed as attorney, counsel, or adviser by the said Norcross in any matter or question between his machine and the Woodworth patent.

Before signing I wish to correct the phraseology of my answer to the 30th cross interrogatory. What I intend to have understood, is, that

the construction of the Norcross machine is such as avoids the necessity of any particular or specific device or contrivance for preventing the board from being drawn towards the axis of the cutter.

WILLIAM A. BURKE.

Deposition of Harvey Silver.

Answers of Harvey Silver to the interrogatories hereto annexed on the part of the respondents.

1. To the first interrogatory he says: I am forty-one years old; I reside in Chelmsford; I am a machinist, and have been so for twenty-five years; I have occasionally examined and compared machines and patents with a view to their novelty and identity, and I have been examined two or three times in patent cases as an expert.

2. To the second interrogatory he says: I am acquainted with the patent, and its specification and drawings, granted to William Woodworth, December 27, 1828, and with the said reissue of the date of July, 8, 1845. The said reissued patent describes the same invention, substantially, as the said original patent, and the new patent is for the same invention as the old one. The same mechanical contrivances are in both machines, except that there are feed rollers in the last, and a rack and pinion and carriage in the first. The pressure rollers and the cutting cylinder, which are the principal essential parts, are the same in both.

3. To the third interrogatory he says: I am not acquainted with said patents, or any of them.

4. To the fourth interrogatory he says: I know not.

5. To the fifth interrogatory he says: I know not.

6. To the sixth interrogatory he says: I am acquainted with the patent, granted to Nicholas G. Norcross, February 12, 1850, for an improved planing machine, and have seen his machines in operation. I have frequently seen the Woodworth machine in operation, and recently. The Norcross machine is substantially different in structure, principle, and mode of operation. Woodworth has a stationary bed below the cutter, with two pressure rollers to keep the board down, and the knife above the board. Norcross has a bed above the cutter, which is connected with the cutter, and then there are two other stationary beds, one on either side of the cutter. This is an advantage in Norcross' machine, because it holds the board firmer, and because the pressure acts on the board nearer the cutter. It also curves the board by the form of the beds, so that the edge of the knives cuts a concave instead of a convex surface, and it also cuts against an unyielding bed. In the Woodworth machine, the force of the stroke is directed against the vibrating rollers, and this tends to draw the board up from the bed and towards the rollers, which is a disadvantage. The cutting against a concave surface is an advantage, because the fibres are compressed at the cutting point, presenting a more solid surface to the edge, and the knots are also held tighter.

7. To the seventh interrogatory he says: In Norcross's machine, the board is kept in place by the weight of the cutting cylinder, and by what he calls a rest, and what I called a bed in my previous answer. A weight may be added, if necessary. I think this is substantially different in structure and mode of operation from the rollers in the Woodworth machine.

8. To the eighth interrogatory he says: The Norcross machine has not any combination of rotating plane with rollers, or any analogous device, substantially like the Woodworth machine.

9. To the ninth interrogatory he says: I do not think the Norcross machine has either of the combinations described and claimed in the Woodworth patent of 1845.

10. To the tenth interrogatory he says: In the Woodworth machine, the pressure of the rollers prevents the rotating planes from drawing the board out of its line of motion and on the cutters. In the Norcross machine, this is effected by the weight resting on the board, and by the arrangement of the three beds.

11. To the eleventh interrogatory he says: I think there is a substantial difference in structure and mode of operation between the solid bench against which the rotating planes cut, in the Norcross machine, and the pressure roller in the Woodworth machine. I think the solid bench is the best, because it holds the board firmer, and for the reasons generally, as stated in my answer to the sixth interrogatory.

12. To the twelfth interrogatory he says: The combination of the moveable cylinder with the fixed bed B, in the Norcross machine, is substantially different in structure and mode of operation from the fixed cylinder with the pressure roller in the Woodworth machine, for the reasons set forth in my previous answer, and especially my answer to the sixth interrogatory.

Answers to the cross interrogatories.

1. To the first cross interrogatory he says: I gave an affidavit before Mr. Corless, in Lowell, at the request of Mr. Norcross, in which I stated the points of difference between his machine and that of Woodworth. I don't know what use was made of it. It was about a year ago.

2. To the second cross interrogatory he says: I never gave any affidavit, except that mentioned in my answer to the first cross interrogatory. I do not know for what purpose my affidavit was taken. I testified at the request of Mr. Norcross.

3. To the third cross interrogatory he says: The document I examined was a paper, partly written and partly in print, with drawings annexed, purporting to be a certified copy of Woodworth's patent of 1828, from the Patent office, at Washington. I saw it for the first time, yesterday, and it is now before me. I have put my name upon the back of it.

4. To the fourth cross interrogatory he says: The drawings I have

examined from a part of the certified copy of Woodworth's patent of 1828, mentioned in my answer to the third cross interrogatory, and are attached thereto by a string and seal. I have put my name on the back of one of the said drawings representing the planing machine.

5. To the fifth cross interrogatory he says: I have formed my opinion solely from the document herein before mentioned, and the drawings attached thereto. I have never seen any model of the said original machine, nor any such machine as is described in the said document, in operation.

6. To the sixth cross interrogatory he says: The cutting cylinder and the pressure rollers, which are claimed in the reissued letters patent, are found in the drawings of the original patent. The pressure rollers are marked *f f*, the cylinder is marked B, and the knives are marked C. They are in the drawing which I have identified by putting my name on the back.

7. To the seventh cross interrogatory he says: I never saw any of the said machines nor the said model.

8. To the eighth cross interrogatory he says: In the reissued patent I find the feeding rollers, which I do not find in the drawings of the original patent. In this last, the board is moved by rack, and pinion, and carriage. My opinion is made up from the drawings and specification, and I cannot say how much it is worth.

9. To the ninth cross interrogatory he says: It is one of the purposes of the original patent of Woodworth to reduce plank to an equal thickness. Plank cannot be reduced to an equal thickness without some pressure, that is, the board must be held fast to the gauge bed, but I do not understand that the pressure need be on that side which is being planed. In Woodworth's machine it is, but in Norcross's it is not.

10. To the tenth cross interrogatory he says: I do find in the drawings of the Woodworth patent of 1828, the representation of rollers on each side of the planing cylinder on that face of the plank to be planed. The machine could not have worked successfully on planks of varying thickness, unless the said rollers had been made self-adapting to the varying thickness of the plank. The reasons are, that the carriage being unyielding, the rollers must yield, otherwise something would break or give way. It would be like drawing a wedge.

11 to 22. To the several cross interrogatories, between the eleventh and the twenty-second inclusive, he says: I know not.

23. To the twenty-third cross interrogatory he says: In the Norcross machine, when the plank is being planed and reduced by the action of the cutters on one of its sides, the other side is held firmly against a plate, bed or rest, to prevent vibrations taking place whilst under the action of the knife, and to secure the reduction of the board to an equal thickness.

24. To the twenty-fourth cross interrogatory he says: In the machine, when the plank is being planed and reduced on one side by the action of the cutters, the other side of the plank is held firmly against a solid bed or rest, to prevent vibration taking place whilst under the

action of the knife, and to secure the reduction of the board to an equal thickness.

25. To the twenty-fifth cross interrogatory he says: In both the said machines there are rotary cutters to plane the board, and some mode of keeping the plank in contact with the rest, to reduce it to an equal thickness.

26. To the twenty-sixth cross interrogatory he says: In such machine the board is by the rotary cutters reduced to an equal thickness, and planed at one and the same operation.

27. To the twenty-seventh cross interrogatory he says: I cannot answer this interrogatory more fully than I have already done in my answer to the sixth direct interrogatory.

28. To the twenty-eighth cross interrogatory he says: There is no substantial difference in the result of the two machines. I consider the manner in which the board is held to constitute a change of principle.

29. To the twenty-ninth cross interrogatory he says: I think the new principle introduced by the Norcross machine consists in the mode by which the boards are held.

30. To the thirtieth cross interrogatory he says: The mechanical devices in the Norcross machine do not supersede the necessity of any of the processes or operations enumerated in this interrogatory.

32. To the thirty-second cross interrogatory he says: My notion of the principle of a machine is the way it works; I don't know that I can express it otherwise. I suppose the use of analogous devices or mechanical equivalents in a machine does not change the principle.

33. To the thirty-third cross interrogatory he says: I have been working as a machinist for twenty-five years; it has been my employment since boyhood. I cannot say how long I have been an expert; I have testified two or three times as an expert. I have been engaged in the manufacture of different kinds of machinery, mostly cotton and woollen machinery, and worked for many years as a practical mechanic.

34. To the thirty-fourth cross interrogatory he says: I have never examined any machine which I regarded as an infringement of the Woodworth patent.

35. To the thirty-fifth cross interrogatory he says: The principles embodied in the said machine consist in the combination of the cutting cylinder with the pressure rollers.

36. To the thirty-sixth cross interrogatory he says: The mode of operation in the said machine is to cut the board in a direction opposite to its motion, and against the pressure rollers.

37. To the thirty-seventh cross interrogatory he says: I do not think the mere inverting a machine would constitute a change in principle or mode of operation. I consider the substitution of weighted or yielding bars or plates for the pressure rollers in the Woodworth machine, to constitute an essential change in the mode of operation of the Woodworth machine.

38. To the thirty-eighth cross interrogatory he says: I think such a

change as is described in this interrogatory would constitute a change in the mode of operation.

39. To the thirty-ninth cross interrogatory he says: I think such a change would constitute an essential change in the mode of operation.

40. To the fortieth cross interrogatory he says: I am not of counsel or attorney for the defendants or either of them, in this or any other cause, nor for any party using or owning any planing machine.

41. To the forty-first cross interrogatory he says: I have not been employed or consulted by said Norcross as counsel, attorney, or adviser, on any question concerning his machine.

HARVEY SILVER.

UNITED STATES OF AMERICA,
District of Massachusetts, ss., city of Boston.

On the twenty-seventh and twenty-eighth days of March, and the first and second days of April, A. D. 1851, I caused the witnesses aforesaid, James B. Francis, William A. Burke, and Harvey Silver, to come before me, and each witness while present before me, I examined carefully on oath, touching the premises, and in reply to the interrogatories hereto annexed. And their answers were reduced to writing by me, and subscribed by each of the said witnesses in my presence. These depositions are taken by virtue of the commission hereto annexed, and to be used in the cause therein mentioned, and all the directions contained in the said commission were carefully observed by me in executing the same.

GEO. S. HILLARD, *Commissioner.*

Commissioner's fees, $40 00.
Deponents' " 6 25.

UNITED STATES OF AMERICA,
Massachusetts district, ss.

[L. S.] The circuit court of the United States, within and for the Massachusetts district.

To George S. Hillard and Benjamin F. Hallett, esquires, United States commissioners.

Know ye, that reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed, of Edmund Burke, of Newport, New Hampshire, witness to be examined on behalf of the respondents, and to be used in a certain cause now pending in said court, wherein Artemas L. Brooks et als., complainants, versus John Fiske et al., respondent.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses as aforesaid to be brought before you, and each witness, while present before you, to examine carefully on oath touching the premises. And when you shall have taken the examina-

tion as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence. And the same so taken and subscribed, to return, together with this commission and your doings herein enclosed, sealed and directed to the circuit court aforesaid, to be holden at Boston, as soon as the same shall have been executed.

In testimony whereof we have caused the seal of the said circuit court to be hereunto affixed.

Witness the honorable Roger B. Taney, at Boston, this twelfth day of March, in the year of our Lord one thousand eight hundred and fifty-one.

ISAAC O. BARNES,
Clerk of the circuit court of the United States, Massachusetts district.

N. B. You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the deposition, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the deponent whilst giving his deposition in answer to the interrogatories annexed to this commission. And you shall take such deposition in a place separate and apart from all other persons, and permit no person to be present during such examination, except the deponent and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the deposition to writing. And you shall put the several interrogatories and cross interrogatories to the deponent in their order, and take the answer of the deponent to each, fully and clearly.

Circuit court of the United States, Massachusettes district.

BROOKS and others
vs.
FISKE and another. } In equity.

Interrogatories to be proposed to Edmund Burke, of Newport, New Hampshire.

1. State your age, residence, and occupation, and how long you have been engaged in your occupation; and whether you have been accustomed to examine and compare machines and patents with a view to their novelty and identity; and whether you have been frequently, or how otherwise, examined in patent cases as an expert.

2. Are you acquainted with the patent, and its specifications and drawings, granted by the United States of America to William Woodworth, on the twenty-seventh day of December, A. D. 1828, for an improved planing machine, and with the reissued patent aforesaid, granted to William [W.] Woodworth, administrator of the said William Woodworth, with an amended specification, on the eighth day of July, A. D. 1845? If yea, state whether the said reissued patent describes

the same invention as the said original patent, or how otherwise. Is the new patent for the same invention as the old one? State your opinion, and the reasons for the same, fully and at large.

3. Are you acquainted with the patent granted in France, March 15, 1817, with an addition, March 30, 1818, to Messrs. Roguin, for a planing machine; and a patent granted in France, March 9, 1825, with an addition, April 28, 1825, to M. Manneville, for machines for grooving, planing, and reducing to an even thickness, boards, &c., or with the descriptions of said patents and machines, published in the French work called Brevets d'Inventions, vol. 23, pages 207 to 212, plates 27 and 28, and vol. 41, pages 111 to 116, plate 12? If yea, state whether the same contain, or describe any, and what part, of the invention described or set forth in the said Woodworth patent, granted the twenty-seventh day of December, A. D. 1828, or reissued July 8, 1845. State particularly what material parts and combinations, if any, are substantially the same in the said French machines and the said Woodworth machine. How do said machines compare in the mode of operation?

4. Have said French machines, or any of them, rotating planes in combination with rollers, or any analogous device to keep the board in place, substantially like the Woodworth machine, or how otherwise?

5. Could a mechanic, skilled in planing machines, by the aid of said French patents, make the Woodworth machine, or any, and what part thereof, without invention?

6. Are you acquainted with the patent granted by the United States of America to Nicholas G. Norcross, one of the defendants, on the twelfth day of February, A. D. 1850, for an improved planing machine, or any model or machine made according thereto; and are you acquainted with the said reissued Woodworth patent, or any model or machine made according thereto? If yea, state whether the said Norcross machine is substantially different in structure, principle, or mode of operation, from the said Woodworth machine, or how otherwise. Compare said machines together, and point out the differences in the Norcross machine from the Woodworth machine, and the advantage or beneficial effect of such differences, if any there be.

7. What device has the Norcross machine for keeping the board in place while planing? State whether the same be or be not substantially different in structure and mode of operation from the rollers in the Woodworth machine for the same purpose.

8. Has the Norcross machine any combination of rotating planes with rollers, or any analogous device, substantially like the Woodworth machine?

9. Has the Norcross machine either of the combinations described and claimed in the Woodworth patent of 1845?

10. What prevents the rotating planes from drawing the board out of its line of motion, and on to the cutters in the two machines?

11. State whether there be a substantial difference in structure and mode of operation between the solid bench, against which the rotating

planes cut in the Norcross machine, and the pressure rollers in the Woodworth machine; and state which is the best, the bench or the roller, for cutting against, and give the reasons for your opinion.

12. State whether or not the combination of the moveable cylinder, with the fixed bed B in the Norcross machine, is substantially different in structure and mode of operation from the combination of the fixed cylinder with pressure roller in the Woodworth machine, and give the reasons for your opinion.

A true copy.

Attest: ISAAC O. BARNES, *Clerk.*

The cross interrogatories propounded by the plaintiffs to a certain expert, a witness for the defendant, to wit, Edmund Burke, of Newport, N. H.

1. Have you ever before this testified or given affidavits in any cause in court, or in connexion with any application for legal proceedings under the Patent law before any person, court, or officer, in which affidavits or testimony you have given your opinions, or any questions of originality or novelty, or of infringement, in connexion with the Woodworth patent? If you have, state how many times you have so testified, at what dates, and whether orally or in writing.

2. Have you ever given any affidavits on such subjects as above inquired of, which were to be used ex parte for publication, or otherwise; if so, how many, and to whom, and at what dates, as near as you can fix them? State also the purpose for which you understood your testimony to have been taken in each and every of the above instances, and at whose request you testified.

3. State what document you have examined as the original patent and specification granted to Wm. Woodworth, when you first, and when you last, so examined it, and what mark or means of recognising the identity of the instrument so examined you affixed.

4. State what document of draft you have examined as the original drawings of the specification and patent granted to Wm. Woodworth, or as a copy of the same; when you first, and when you last, so examined it; what mark or means of recognising the identity of the drawings so examined you affixed.

5. State whether you have formed your opinion, in whole or in part, respecting the original patent granted to Wm. Woodworth from any model of the original, or from having seen said original machine, or any of them; if from a model, was it made at or before the granting of said letters patent, or since then, and by whom was it made, and what mark or means of identifying said model have you affixed thereto?

6. State whether or not any, and if any, which of the devices, the combination of which is claimed in the reissued letters patent, are to be found in said drawings; please to be particular in your description, and append a copy of said original drawings, or so mark and designate the drawings from which you testify that they may be identified.

7. State whether or not any, and if any, which of the devices, the

combination of which is claimed in the reissued letters patent, were to be found in any of the original machines of said Woodworth which you saw before the year eighteen hundred and twenty-nine. Whether or not [any,] and if any, which of the devices, the combination of which is claimed in the reissued patent, were to be formed in the model of the machine by said Woodworth, filed in the Patent office at or prior to the the issue of the said letters patent, or which you may have made from the original machines by said Woodworth, set in use prior to eighteen hundred and twenty-nine, or which you may have compared with, and known to be an exact description of, said original machines.

8. State whether or not any, and if any, which of the devices, the combination of which is claimed in the said reissued letters patent, you are unable to find either in the drawings, the authentic model, or the original machines used by said Woodworth prior to the granting of said original letters patent; and if you answer that all these means of making the comparison are not within your knowledge and command, say how much credit and value you, as an experienced expert, think ought to be attached to opinions on the reissue, made up without the knowledge or examination of the identical machine, or of all these evidences of the machine, on which the letters patent were originally granted.

9. Is not one of the purposes stated in the original patent of Woodworth to reduce [to] an equal thickness; and if yea, can you point out any practical mode of reducing plank to an equal thickness by means of rotating planes, without pressure rollers or their equivalents, for making pressure on that face of the plank which is being planed; and if you can point out any such mode, do so clearly and fully, and if you can, accompany such description with a drawing or drawings.

10. Do you not find in the drawings of the Woodworth patent of 1828 the representation of rollers on each side of the planing cylinder, and on that face of the plank to be planed; and if yea, could the machine have worked successfully on planks of varying thickness, unless the said rollers had been made self adapting to the varying thickness of the plank? Give your reasons fully for any opinion you may express on this subject?

11. If in answer to the third direct interrogatory you shall have stated that you have read the descriptions and examined the drawings of patents granted in France on the 17th of March, 1817, and 30th March, 1818, to Messrs. Roguin, and also on the 9th March, 1825, with additions on the 28th April, 1825, to Mr. Manneville, state whether you have seen the original patents granted in France, or authenticated copies thereof granted by the Government of France, or whether they were copies purporting to have been extracted from a certain French work entitled "Brevets d'Invention", and if the latter, or translations thereof, please state if you have examined the said work, and give the date of its publication; state whether you read the French language, and whether in testifying as to these French inventions you have relied on your own knowledge of the French language, and the examination of the said work, or on the translations. Have you any

knowledge, other than the publication of the work referred to, of the dates of the said patents, and if so, what?

12. What knowledge have you of the year when said printed work, referred to in the third direct interrogatory, was published? State fully, and give the sources whence you derive this knowledge.

13. If you shall have stated, that you find in the French patents of Roguin and Manneville substantially the same combination as in the Woodworth patent of July 8, 1845, state particularly whether you find said combination in any one, and which one of the said patents, or whether, to find the said combination, you would have to refer to all, or how many, and which of them.

14. If, in answer to the fourth interrogatory in chief, you shall have stated, that you find in the French patents to Roguin, of March 15, 1817, and March 30, 1818, the combination of rotating planes with rollers, or any analogous device to keep the board in place, substantially like Woodworth's, give in your answer the words of the said French patents, which describe such combination, and the letters on the drawings which designate the parts constituting such combination. Do you, or not, find in the said French patent of March 15, 1817, that the plank is to be held to and secured on to the carriage by dogs or clamps? Is not the cylinder or rotating instrument for reducing the face of the plank formed with cutting edges, cut out of a solid block of metal, and resembling what is known among mechanics as the burr cutter, in contra-distinction from planes for shaving wood, and if you find these otherwise, state fully why, and in what particular, they are otherwise. Besides the cutters, do you find in this French patent of 1817 any thing described or represented as passing or lying over the surface of the plank to be planed, other than a cross-piece marked with the letter *x*, called a guide; and if so, please state whether you find, either described or represented, any mode by which the said cross-piece or guide is either pressed down upon the surface of the plank or made to yield to any varying thickness of the plank. Do you find any such cross-piece or guide, stationary or yielding, on both sides of the rotating cutters, and if only on one side, could a machine for planing answer a good practical purpose with only one? If, in the patent of March 30, 1818, you find rotating planes, do you find these combined with a pressure roller, or its equivalent, and if so, point out the letters by which it is designated in the drawings? If, instead of a roller, you find a cross-piece or guide, as in the patent of 1817, please state whether you find, either from the description or drawing, that this said cross-piece or guide is made self-adjusting to the varying thickness of the plank, and if so, point out the same in the description and drawings. Is not the said cross-piece or guide represented as permanently attached to the same carriage with the planing cylinder, which carriage moves on the frame from end to end of the plank that rests on the main frame, and is it not stated in the said specification that the carriage, which carries the planing cylinder and guide, is to weigh about 200 pounds? If yea, could, in your opinion, a practical working machine be made on this

plan? Would such a weight be sufficient to hold down the planing cylinder? The planing cylinder and guide being connected together in the same moveable carriage, would not the two, if they yielded at all, yield together, and thus plane the plank to a varying instead of an equal thickness?

15. If, in answer to the fourth interrogatory in chief, you shall have stated that in the French patent of Manneville, granted March 9, 1825, and the additions thereto, granted April 28, 1825, you find the combination of a planing cylinder with pressure rollers or their equivalents, point out the parts of the description and drawings relating to such combination. Is it not stated in said Manneville's first patent, that the plank to be tongued and grooved is to be securely adjusted on a carriage, and if you shall have stated that you find in the said patent a pressure roller, is not such roller to be used in connexion with some plan of securing the plank to the carriage? Specify particularly in what manner this roller is to be applied, and whether, in your opinion, such mode of application is practicable, and if so, why it is practicable. In your opinion, could a machine be made practically useful with only one such pressure roller, unless in connexion with it some plan was adopted for securing the plank to the carriage? Is the mode of tongueing and grooving plank, in said patent, by means of one cutter wheel on each side, or by means of circular saws, five saws being used for the tongue and three for the groove, together with reciprocating cutters for finishing the groove? If, in your opinion, this mode of tongueing and grooving planks is substantially similar to Woodworth's plan, give your reasons fully for such opinion.

16. In your opinion, would the mode of applying the roller, described in said Manneville's patent, prevent the plank from moving laterally whilst being tongued and grooved, and if yea, point out what is described or represented for preventing the lateral vibration of the plank.

17. Can you understand every part of the description of the said Manneville's patent, and if so, describe the mode of construction, referred to in that part of said patent in which he states that he has enclosed the entire mechanism in a cylinder of 18 inches.

18. In the description in said patent of the mode of planing planks, are the fluted pressure and feed rollers applied to the faces or edges of the plank; and if the latter, is it not stated that the plank is to be placed on rollers that have their axis horizontal, and that the two fluted rollers are vertical and parallel. Such being the position of the parts, are, or are not, the fluted rollers applied to the edges of the plank?

19. Do you understand the construction and mode of operation of the planes for planing the surface or surfaces of the plank described in said Manneville's patent; and if yea, describe the same minutely, and if you can, accompany your description with a drawing or drawings, and do this without the exercise of any knowledge of planing machines, derived from other sources?

20. Do you find in the said patents of Manneville, or either of them,

the combination of rotating planes with pressure rollers for planing planks and reducing them to an equal thickness; and, if yea, point out the said combination in the description. Is there any drawing of the planing machine described in the said Manneville's patents?

21. Does, or not, the addition of the said Manneville, bearing date the 28th of April, 1825, apply solely to a mode of feeding or moving the plank by means of an endless chain of links, to which the planks are secured by dogs and bolts, and to a modification of the roller for taking the warps out of the planks; do, or not, the dogs and bolts, or either of them, for securing the planks to the links of the chain, project above the surface of the plank? Is not the roller grooved for the purpose of admitting of the passage of such projecting bolts, and, if yea, how could such mode be applied when planing the surface of the plank, without destroying the cutting edges of the planes?

22. If, in answer to the fifth interrogatory in chief, you shall have stated that a mechanic, skilled in planing machines, could without invention construct the Woodworth machine, please state from which of the said French patents; and whether, in your opinion, this could be done by a mechanic, having no more skill or knowledge of planing than was known at the time the said inventions purport to have been made.

23. Whether or not, in the Norcross machine, when the plank is being planed and reduced by the action of the cutters on one of its sides, the other side is held firmly against a plate, bed, or rest, to prevent vibration taking place whilst under the action of the knife, and to secure the reduction of the board to an equal thickness?

24. Whether or not, in the Woodworth machine, when the plank is being planed and reduced on one side by the action of the cutters, the other side of the plank is held firmly against a solid bed or rest, to prevent vibration taking place whilst under the action of the knife, and to secure the reduction of the board to an equal thickness?

25. Whether or not, both in the Woodworth and in the Norcross machines, there are rotary cutters to place the board, and some mode of keeping the plank in contact with the rest to reduce it to an equal thickness?

26. Whether or not, in each machine, the board is, by the rotary cutters, reduced to an equal thickness at the same time that it is planed, and if not, how otherwise?

27. What substantial difference, in the process by which the board is planed and reduced to an equal thickness, exists in the two machines?

28. What substantial difference, if any, exists in the result of the two machines, and whether that difference, if any, is a change in principle; and if so, of what principle of the Woodworth machine, and how is that principle changed?

29. State whether or not the mechanical devices in the Norcross machine effect any new and useful change in the operation of planing boards; if so, what is the new principle that is by said Norcross machine introduced into the art of planing boards, which was before unknown?

30–31. Whether the mechanical devices in the Norcross machine supersede the necessity of feeding the boards to the cutter; of holding the board firm against a bed or rest whilst its opposite side is being planed; of preventing the board from being drawn towards the axis of the cutters by the operation of planing; of planing and reducing to an equal thickness by the same operation; of arranging the machines to admit boards of varying thickness to be fed to the cutter; of adjusting the periphery of the cutter at a fixed distance from the bed or rest, which is on the opposite side of the plank or board, to determine the exact thickness that shall be left after being planed; of having the surfaces, between which the plank passes, vary in their distance from each other to accommodate the varying thickness of the plank, whilst the cutting cylinder and the rest opposite to it remain at the same distance apart; of having this varying distance of surfaces self-adapting by pressure, to keep one face of the plank against the rest?

32. If you have answered, at any time, to any questions respecting the principles of the plaintiff's or defendant's machines, please state carefully what definition you attach to the term "principle" of a machine, and whether you understand the use of analogous devices or mechanical equivalents in a machine, to change the principles of such machine.

33 What have been your means of acquiring an expert knowledge of mechanics, and how much time have you spent in acquiring such knowledge; how long have you been an expert, and how often have you before testified as an expert? How many years were you a practical mechanic, and in what branch of mechanics were you practically engaged?

34. Have you ever examined any machine which you regarded as an infringement on the Woodworth patent?

35. What do you regard as the principles embodied in the machine, described in the present Woodworth patent?

36. What do you regard as the mode of operation of the machine, described in the present Woodworth patent?

37. Do you consider the mere inventing of a machine to constitute a change of principle or mode of operation? Do you, or not, consider the substitution of weighted or yielding bars or plates for the pressure rollers in the Woodworth machine, to constitute an essential change in the principle or mode of operation of the Woodworth machine?

38. Would it constitute an entire change in the principle or mode of operation of the Woodworth machine, to connect the bed and rotating planes in a separate frame, and have the pressure rollers stationary, and instead of pressing the plank against the bed, press the bed up against the plank, the bed and rest always retaining the same relative positions?

39. If you shall have stated, in answer to the preceding cross interrogatory, that the change therein suggested would not constitute an entire or essential change of principle or mode of operation, please state in what particular the machine, so changed, would differ in any, and in what, essential respect from the Norcross machine.

40. Are you engaged as counsel or attorney for the defendants, or either of them, in the present cause, or in any suit, present or future, or for any party using or owning any planing machine or machines, and what particular machine; and if yea, is your compensation contingent on the success of such party, or on the defeat of the Woodworth patent?

41. Have you, or not, been employed or consulted as attorney, counsel, or adviser, by Nicholas G. Norcross, on any question of infringement between the Norcross machine and the Woodworth patent; and if yea, is your compensation for such service contingent, or otherwise?

A true copy.

Attest: ISAAC O. BARNES, *Clerk.*

Deposition of Edmund Burke.

I, Edmund Burke, of lawful age, being first duly sworn, in answer to the foregoing interrogatories, to me severally propounded, on behalf of the respondents, depose and say:

1. In answer to the first interrogatory: I am forty-two years of age; I am a resident of Newport, in the State of New Hampshire; I am an attorney and counsellor-at-law by profession, and have been engaged in the practice of that profession from May, 1830, to the present time, with the exception of a little more than five years, during which I held the office of commissioner of patents, and was one of the editors of the Union newspaper, at Washington. I was commissioner of patents from May 5, 1845, to May 19, 1849, and during that time I was accustomed to examine and compare machines and patents, with a view to their novelty and identity. While I was commissioner of patents I was occasionally applied to to give my testimony with regard to machines and inventions, but I declined giving it in all cases, except as to dates, copies, and records in the Patent office. Since I left the office of commissioner of patents, I have several times been called upon to give my testimony, and have given it, in reference to the novelty and identity of machines and inventions. I am no mechanic, and make no other pretensions to the knowledge of machines and inventions than that which I acquired while executing the duties of the office of commissioner of patents; and while I filled that office I had occasion every week to examine machines and inventions more or less. And if this experience, and if giving testimony concerning machines and inventions, under such circumstances, constitute me what is technically called an expert, then I am one; if otherwise, then I am not.

2. Answer to the second interrogary: I am acquainted with the patent, and its specifications and drawings, granted by the United States of America to William Woodworth, on the twenty-seventh day of December, A. D. 1828, for an improved planing machine, and with the reissued patent granted to William W. Woodworth, administrator of the said William Woodworth, with an amended specification, on the

eighth day of July, A. D. 1845. As I understand it, the reissued patent describes and claims much more than was described and claimed in the original patent. The former patent, that is, the reissued patent, sets forth, describes, and claims certain combinations of machinery for planing, tongueing and grooving, as the invention of William Woodworth, deceased; whereas the original patent describes and claims a method of reducing a plank or other material to a given width, by means of circular saws or friction wheels; the improvement and application of cutting or planing wheels to planing boards, plank, and other material; and an improved method of cutters for tongueing, grooving, and cutting mouldings. The former of these methods or improvements, viz., the mode of reducing boards, &c., to a given width, has, I believe, been disclaimed and abandoned. These improvements all imply single inventions, or rather, the improvement of certain particular parts of the planing, tongueing, and grooving machine, and not the aggregation of parts of machinery, known or not known before, into a new combination, in which the various parts act in harmony and concurrence with each other as a whole, to produce a certain result, viz., the planing of boards, &c. They imply that the inventor understood that the planing machine had before existed, combining all the parts of machinery or elements of the combinations set forth and claimed in the reissued patent, but in a defective form. Those defective parts, namely, the improvement of the planing wheel, and of the tongueing and grooving cutters, William Woodworth claims, in his original patent, to have improved. With respect to the planing wheel he claims a little more, namely, its application to planing boards, &c. But, in this, he was evidently mistaken, inasmuch as rotating cutter wheels, or "cutter rollers," applied to planing and moulding, are described by Samuel Bentham of England, in the specification of his new methods of working wood, metal, and other materials, dated April 23, 1793. See Repertory of Arts, &c., vol. 10, pp. 303, 304, and 305, London, 1799; and also in France, in the machinery of M. Roguin. The inventions claimed by William Woodworth, in his original patent, therefore, were for improvements in certain parts of the planing, tongueing, and grooving machine, and not for the combination of machinery constituting the planing machine. On the contrary, the reissued patent describes and claims no new improvements on the parts of machinery, or devices, constituting the combinations known as the Woodworth planing, tongueing, and grooving machine, but abandons them, and describes, not only what the original specification and drawing attached to the original patent described, but it describes much additional matter, and claims the whole, not as original inventions or improvements, but as combinations, which William Woodworth appears not to have contemplated as new or original with him. The reissued patent does not claim the improvement of the cutter wheels, as described and claimed in the original patent, nor its application to the planing of boards, or other material; nor does it claim the improved cutters for tongueing, grooving, and cutting mouldings, as described and claimed in the ori-

ginal patent. But it claims, 1st, the employment of rotating planes, as therein described, in combination with rollers, or any analogous device, to prevent the boards from being drawn up by the planes when cutting upwards, or from the reduced or planed to the unplaned surface; 2d, it claims the combination of the rotating planes with the cutter wheels for tongueing and grooving, for the purpose of planing, tongueing, and grooving boards, &c., at one operation; 3d, it claims the combination of the tongueing and grooving cutter wheels, for tongueing and grooving at one operation; 4th, it claims the combination of either the tongueing or the grooving cutter wheels, for the tongueing or grooving of boards, &c., with the pressure rollers. And it alleges that the effect of the pressure rollers, in the operations of planing, and of tongueing and grooving, is such as to keep the boards, &c., steady, and prevent the cutters from drawing the board towards the centre of the cutting wheels whilst it is moved through by machinery. In the planing operation, it alleges, that the tendency of the rotating plane is to lift the board directly up against the rollers; but in the tongueing and grooving operation the action of the cutters is to overcome the friction occasioned by the rollers. Such are the differences in the claims of the respective Woodworth patents, original and reissued. I will now proceed to point out some of the particular parts, described and claimed in the reissued patent, which are not described and claimed in the original patent. And, first, the rollers. In the reissued patent, fig. 7 of the drawing, attached thereto, (being exhibit A, signed by me,) there are two pairs of rollers represented, marked f, f^1, described in the specification as friction or feed rollers. One (f) of each of these pairs of rollers, which is the under roller, is described as fixed or stationary, that is, having no motion but a rotary one upon its own axis. The other, or upper roller (f^1), of each of these two pairs is represented in the figure of the drawing referred to, and described in the reissued patent, as having its bearings so adjusted as to permit an upward and downward motion, in order to adjust itself to the varying thickness of the board passing between them in the operation of planing, being required to exert a due pressure upon the upper surface of the board by weights or other means of pressure. The office of these pairs of rollers, as represented in fig. 7, is to feed the board to the cutting cylinder, and to prevent it from being lifted up by the action of the cylinder to its centre. Thus a board operated upon in the machine, as represented in fig. 7, would be inserted beteewn the friction or feed rollers, which would advance it by the planing cylinder through the corresponding pair of rollers on the other side, at the same time preventing the board from being drawn or lifted towards the centre of the cylinder by the action of the planes. Perhaps I should here remark, that the planing cylinder, as described in the reissued Woodworth patent, revolves in a direction opposite to the progressive motion of the board upon which it operates, thus cutting upwards from the planed to the unplaned surface, and tending to lift or draw the board towards its centre. In the vertical machine, as represented in the drawings annexed to the reissued patent, (see exhibit A,)

and referred to in the specification as fig. 1, there are fixed in the frame-work, constituting the bed of the machine, six rollers, each of which is marked *f*, three only of which, however, would come into operation in planing a single board, as that appears to be the representation of a double machine. These rollers appear to have stationary bearings, and to be susceptible of rotary motion only. They have no corresponding rollers above and parallel to them, having both rotary and vertical motions, as the rollers marked f^1, f^1, in fig. 7. The office of these seems to be merely to prevent friction. There are also represented in the same machine, on the side represented to be in operation, three upright or vertical rollers, each marked f^1, and also three rollers of the same kind on the other side of the machine. These rollers appear to have their axles fixed in stationary bearings, both at the top and bottom, which permit of none but a rotating motion. They have no rollers opposite and parallel to them, as in the machine represented in fig. 7. Nor do they appear to have any device by which they would be permitted to have a forward and backward motion at right angles with their axis of rotation, corresponding to the device by which the rollers f^1, f^1, in fig. 7, are permitted to have an upward and downward motion, according to the inequalities in the thickness of the board to be planed; on the contrary, these vertical rollers f^1, f^1, f^1, in fig. 1, being apparently fixed and stationary in their bearings, and having none but a rotary motion, can have no other office to perform than that of preventing friction, like the horizontal rollers in the machine, unless it be merely to guide the board on which the machine is operating. And as there appears to be in the machine, represented by fig. 1, corresponding to that which permits a vertical motion upwards and downwards, as well as a rotary motion of the rollers f^1, f^1. in fig. 7, I infer that the rollers f^1, f^1, f^1, in fig. 1, perform the office only of guides. I am aware that the specification, attached to the reissued patent, describes them as having such a motion. It says, "they may be borne against it, [the plank,] by means of weights and springs in a manner well known to machinists." But there is no such device represented in fig. 1 of the drawings. Nor is there such a device represented in the drawing attached to the original patent, which is marked exhibit B, and signed by me; nor described in the original specification, which is attached to the same exhibit B, signed by me. In the original specification rollers are mentioned, but they are mentioned only as a device for moving the board towards the rotary planes, and only as an equivalent to the rack and pinion, or any other well known mechanical device for producing lateral or longitudinal motion. The idea is not even suggested, that they have a yielding motion to and from the carriage, on which the plank is confined, as well as a rotary motion. And on looking to the original drawing annexed to exhibit B, no such device appears. In this drawing six horizontal rollers, *f*, *f*, *f*, *f*, *f*, *f*, are represented, having their journals fixed and stationary, allowing only of a rotary motion, whose office can only be to prevent friction, and to aid, perhaps, in advancing the plank. There are also

represented in the same drawing six vertical rollers, marked also *f*, *f*, *f*, *f*, *f*, *f*, one of which, on each side of the machine, at the end where the plank emerges having both of its journals stationary, and the remaining four having only their lower journals in bearings, which appear to be stationary, admitting only of a rotary motion; while the other ends have no journals, and appear not to be confined in any way. There appears to be no device, by which they may be borne against the plank by weights or springs, nor by which they can have any other motion but a rotary. Thus constructed and arranged, they seem to have no other office to perform except to guide the plank, or carriage on which it is confined, and, perhaps, aid in advancing it. And this conclusion is strengthened by the evident position and action of the planes on the cutting cylinder. In the original drawing annexed hereto, and above referred to, (see exhibit B,) the position of the edges of the planes indicates that they rotate in the same direction with the advancing motion of the board, instead of in the opposite direction, as set forth in the amended specification; thus cutting from the outer or unplaned surface to the inner or planed surface of the board. If such were the arrangement of the original machine of William Woodworth, of which I have no doubt, judging solely from the specifications and drawings attached to his original patent, the pressure rollers f^1, f^1, as they are called in the reissued specification, would be unnecessary, inasmuch as the planes in a horizontal machine would cut downwards towards the bed on which the carriage holding the plank was moved, thus having no very perceptible tendency to lift or draw up the plank towards the centre of the planing cylinder, which it is one of the offices of the pressure rollers as described and claimed in the re-issued patent to prevent. On the contrary, the action of the planes revolving in the same direction with the advancing motion of the plank, and cutting downwards from the unplaned to the planed surface, would have just the opposite tendency, and would therefore supersede the necessity of pressure rollers to prevent the plank from being drawn up towards the centre of the planing cylinder. I speak now of a horizontal machine. The effect would be the same in a vertical machine. Hence, from the description of the rollers in the original specification, and the machine as represented in the original drawing, both of which are above referred to, in exhibit B, I infer that William Woodworth invented no such device as that described in the re-issued patent to prevent the plank from working up towards the centre of the planing cylinder, by means of pressure rollers. Nor was such a device described or represented in his original specification and drawings. And in these particulars, there is matter set forth, described, and claimed in the re-issued patent, specifications, and drawings, which is not set forth, described, and claimed in the original patent, specification, and drawings. The description and drawings annexed to William Woodworth's original patent are in harmony with what appears to have been his real machine, and what he believed he had invented; but they are not in harmony with the machine described and claimed in the re-issued patent and drawings.

Again, there does not appear to be in the machine described and represented in the original specification and drawings any device by which the bed over which the board passes, and the planing cylinder, can be made to approach or recede from each other, in order to gauge the thickness to which the board must be planed. In the machine as described in the original specification and drawings, the bed, or vertical bench, (apparently the side of the frame of the machine,) on which the carriage, upon which the plank is confined, rests, in the operation of planing, is stationary, having no motion whatever. The planing cylinder is also confined in stationary bearings, and therefore cannot be made to approach to, or recede from, the bed or bench. Thus it is evident, that the thickness of the plank must be gauged by some other contrivance. That contrivance is described or alluded to in general terms in the original specification. It was done by means of some device not particularly described, upon the carriage. William Woodworth, in describing in his original specification the mode in which the thickness of the plank is to be gauged, says: "The plank or other material resting on the carriage may be so set as to reduce it to any thickness required." This implies, that the bed on which the carriage moved was stationary, and that the axes of the cylinder were also fixed in stationary bearings, and that the thickness to which the plank was to be planed was to be determined by its proper adjustment on the carriage, and not by a device by which the bed and the planing cylinder could be made to recede from and approach to each other. The former method of gauging the thickness of the plank described in the original specification, is alluded to in the re-issued specification; and that specification goes on and sets forth and describes other methods not in the original machine or description.

It describes the method of making the bearings of the shaft of the planing cylinder moveable by screws, or other means, to adjust it to the rack; or the carriage, or the bed plate, may be made so as to raise the board or plank up to the planing cylinder, and thus gauge the thickness to which it is to be reduced. This latter device would be analogous to the device by which the planing cylinder is made moveable; but, in my opinion, neither of them is analogous to the method of gauging the thickness of the board upon the carriage. Thus, in those particulars, the re-issued specification and drawings describe and set forth matters not described nor set forth in the original specification and drawings of William Woodworth. There are some other unimportant particulars in which the machine differs; for instance, the guide stops, r, r, in figure 7, which are an improvement upon the horizontal rollers in the machine, in figure 1. Therefore, for the reasons above set forth, my conclusion is, that the re-issued patent does not describe the same inventions as those which are described in the original patent. It sets forth matter not set forth and described either in the specification or drawings of the original patent, and it claims certain combinations as the inventions of William Woodworth; whereas the original patent described and claimed the improvement of the planing cylinder,

and its application to planing plank, and the improvement of cutters for tonguing, grooving, and cutting mouldings. These are simple inventions or improvements in particular parts of the assemblage of machinery constituting the planing machine, and were claimed as such only. And, in my judgment, the re-issued patent should have been confined to the more full and clear elucidation of these improvements. I cannot see how they could, in accordance with the Patent laws, be converted into combinations, which are entirely different things, as they have been in the re-issued patent.

3. Answer to the third interrogatory: I am not acquainted with the patents granted in France to MM. Roguin and Manneville, referred to in this interrogatory. But I am acquainted with the descriptions of said patents and machines published in the Brevets d' Invention, contained in the volumes, pages, and plates of that work, mentioned in this interrogatory. That is to say, I once examined them in the same work in the Patent office of the United States, in company with Walter R. Johnson, esq., of that city. It was in February, 1850. We examined both the descriptions and drawings of the machines invented by MM. Roguin and Manneville in the work mentioned in the interrogatory, to which this is in answer. I have now other copies of the same volumes of the "Brevets d' Invention" before me. And I have also an English translation, or what purports to be one, of the specifications or descriptions of the machines of MM. Roguin and Manneville, contained in the volumes above mentioned, which, inasmuch as I do not so readily read compositions in the French language involving numerous technical, scientific, or mechanical terms, as I do those of a different character, I shall refer to in this deposition, and which I hereto annex, as exhibit C, signed by me. This translation of the descriptions of the inventions of MM. Roguin and Manneville, represented in the two volumes of the Brevets d' Invention, mentioned in the interrogatory to which I am now answering, I have carefully examined in connexion with the drawings of the two inventions also contained in the same volumes of that work, and referred to in the interrogatory. I think the two machines of M. Roguin particularly contain the substantial principles, elements, and combinations of mechanism which constitute the Woodworth machine, as described in the Woodworth patent granted December 27th, 1828. And the principle of the combination is the same in the Woodworth re-issued patent and the modern Woodworth machine, although in the latter machine are some changes in details, not changing the principle of the combination.

There is, indeed, a striking resemblance between the machines of Roguin and that of Woodworth's original machine. They may be said to contain analogous and equivalent devices and combinations. In Woodworth's machine, as described in his original patent, the plank or board was fastened to a carriage forced through the machine by rack and pinion, or some other equivalent device, and moving on rollers. Those rollers were horizontal and stationary in their bearings. On this carriage the plank was placed, and gauged so as to be planed to

any required thickness. And thus adjusted, it was drawn along with the carriage under the planing cylinder, which was also a principal feature in the Woodworth machine. Roguin's machine has also a carriage. In plate 27, vol. 23 of the Brevets d'Invention, fig. 2, it is represented as *b*, and in fig. 3, same plate, it is represented as *b*. It moves over a projecting part of the stationary bed or frame *a*, called the cornice, and marked *c*, on six small wheels, three of which are on each side as represented in fig. 3. These wheels appear to perform the same office as the horizontal rollers marked *f* in the drawing attached to the original patent of William Woodworth, in fig. 1, and fig. 7 of the re-issued patent, and must be regarded as not only analogous but equivalent devices. This carriage has a moveable floor on which the plank is placed, which is elevated or depressed by means of screws for that purpose, as may be necessary to gauge the thickness of the plank to be planed. William Woodworth in his original specification, after referring to the moveable carriage in his machine, says, "the plank or other material resting on the carriage may be so set as to reduce it to any thickness required," thus implying that the carriage possessed a device for such an operation, although none is particularly described. So far the machines of Roguin and Woodworth appear to be analogous, and I think substantially the same. Roguin's machine has cutting cylinders, not only for tongueing, grooving, and moulding, but for planing. In his first machine, they were fixed upon a shaft whose axles revolved in stationary bearings, admitting of no motion, vertical or lateral. The board was drawn along on the carriage under either of these cutter wheels, according to the work to be done, whether it was tongueing, grooving, moulding, or planing. So far it corresponds again with the Woodworth machine, as described both in the original and the re-issued patents. Roguin's machine also had a cross piece represented as *x*, in plate 27, fig. 2, called a guide, which would appear to perform the office of the first upper roller, marked f^1, in the Woodworth machine, as represented in the drawings attached to his original patents, and also in fig. 1, in the drawing attached to the re-issued patent. In Roguin's original patent, the cutters upon his tongueing, grooving, moulding, and planing cylinders, are a little different from those described and represented in the Woodworth patents, both original and re-issued. The edges or blades are cut obliquely upon the respective cylinders. See plate 27, fig. 4, *p*, *o*, *n*, and *q*, for the particular mode in which the blades are cut. Of course, in the planing cylinder *n*, the edges or blades would, as in the Woodworth, if the planes were set diagonally on the planing cylinder, describe the segment of a helix. Such was the form of the planing and other cylinders described in M. Roguin's first patent. In his patent of improvement and addition embraced in the translation annexed, marked exhibit , he introduced a new form of cutters or blades, the planing cutters corresponding very nearly, if not precisely, with the planing cutters of the Woodworth machine. See plate 28, fig. 7, and its details, *d*, *b*, *c*, e^1, f^1. In the original cutting cylinders of M. Roguin,

the edges or blades were perpendicular with the axis. In his improved cutters, as represented in fig. 7, above referred to, they are almost tangent to the circumference, thus corresponding with the planes upon the Woodworth planing cylinder.

In the first machine of Roguin's, represented in plate 27, I infer from the lines representing the cutting edges of the planing and other cylinders, that the direction of rotation of those cylinders was opposite to the direction of the board as it was moved by them. They therefore cut upwards from the planed to the unplaned surface, like the planes of the Woodworth machine described in the reissued patent. They would therefore have the same tendency to lift the board towards the centre of the planing cylinder, as in the Woodworth machine described in the reissued patent, which it is the office of the pressure rollers to prevent. There appears to be no device precisely the same as pressure rollers in Roguin's first machine, unless the cross bar *x*, called the guide, and the ends of the axle or shaft bearing upon the edges of the carriage *b*, or the weight of the carriage upon which the board is confined, perform that office, which I think they do. In the improved machine of M. Roguin, represented in plate 28, the planes appear to strike from the outer or unplaned to the planed surface, thus superseding the necessity of pressure rollers to keep the board from working up towards the centre of the planing cylinder. And here it may be proper to remark, that the pressure rollers are necessary or not, according to the direction of the revolution of the planes. If they revolve in the same direction in which the board moves, they cut from the unplaned to the planed surface, thus having no tendency to lift the board towards the centre of the cylinder, and, of course, no necessity for pressure rollers, or other analogous device, to prevent such a tendency. If they revolve in a direction contrary to the advancing motion of the board, then such a device becomes necessary, and would suggest itself to the simplest mind. But merely changing the direction of the revolution of the planing cylinder, and thereby causing it to cut from the unplaned to the planed surface, or the reverse, could not be considered as requiring any inventive faculty, and could not properly be the subject of protection by a patent.

In the first machine of M. Roguin, the weight of the carriage and board would be sufficient, I think, for all practical purposes, to prevent the board from being lifted too much towards the centre of the planing cylinder. If the weight of the carriage and board were not sufficient, the action of the cross bar *x* would certainly prevent it. In which case, it would be, in my opinion, in principle, the same as the Woodworth machine, as described in the reissued patent.

In the improved machine of M. Roguin, described in his additional patent, and represented in plate 28, of vol. 23, of the Brevets d' Invention, he describes another method of applying his planing cutters to the board. In this machine, the board is placed upon a stationary bed with a device, (which is described,) for elevating or depressing it in order to gauge it for the required thickness, and the planing cylinder is

made to pass over it from one end to the other. It is set in a frame of cast iron, which, with the cylinder, is required to be of sufficient weight to prevent it from being lifted up by its action upon the board, an effect which M. Roguin, in his specifications, alleges is much less likely to take place from the action of his improved cylinders than from his old ones, in consequence of the edges of the planes of the former projecting from the cylinder in a line almost tangent to its circumference, and therefore striking the wood in an oblique direction from its surface, and the edges of the latter projecting in a line perpendicular from its axis, and therefore striking the upper surface of the wood in a line much less oblique. M. Roguin evidently intends to have his planes in his new machine revolve in the same direction with their advancing motion, thus cutting from the outer to the planed surface of the board; whereas, in his first patent he evidently intends their motion, and consequently their action upon the board, to be the reverse.

Thus, again, in M. Roguin's improved machine, although the board is stationary, and the planing cylinder is made to progress as well as revolve, we find the substantial principle of the Woodworth machine, the combinations of mechanism which embody the principle of that machine. We find a table or bed on which the board rests, having a vertical motion by means of elevating screws, by which the board can be so gauged as to be reduced to any required thickness; and in combination with this, we find a planing cylinder borne upon a carriage over the board, with its frame of sufficient weight to keep its cutting edges from being lifted from the board, thus causing it to reduce the board to the thickness required. It is true that in the improved machine the board is stationary, and the cutting cylinder moves, but that cannot be different in principle from the combination in which the planing cylinder has no lateral motion, and the board has. It may require a little different mechanism to produce the different motions, but they are in principle the same, as I understand them. Mr. Woodworth claims in his original patent the application to planing boards, as well as the improvement of the rotary planing cylinder. He was evidently mistaken in claiming the application of such a cylinder to such a purpose, as M. Roguin had made the application before him. M. Roguin had also invented the combination of a planing cylinder with cutters for tongueing, grooving, and moulding, all at the same operation. Therefore it left nothing for Mr. Woodworth to invent but pressure rollers, and those seem to have been provided for by him by devices substantially the same, or entirely superseded by the arrangement of the various parts of the mechanism of his machine. Therefore there seems to have been nothing left for Mr. Woodworth to invent, but simple improvements in the planing cylinder, and in the cutters for tongueing and grooving. Those improvements he supposed he had invented, never once imagining that he had invented new and original combinations, such as are set forth and claimed in the reissued patent.

In de Manneville's machine for tongueing and grooving, described

in the 41st vol. of the Brevets de'Inventions, plate 12, and pages referred to in the interrogatory, there appears to be a combination of machinery for tongueing and grooving at one operation. It is, however, effected by a different combination of tools from that used in the Woodworth machine. In this combination five saws are employed in the operation of tongueing; one to joint the stuff, two to cut the board on each side to a sufficient depth to make the tongue, and two running on the same vertical spindle to cut away the stuff down to the backs of the two wheels or saws just mentioned, thus leaving a tongue. This tongueing is finished by a fork traversing along after the wheel, removing the little sticks cut by the saws, and paring off slightly the edges of the tongue to make it enter more easily the groove for which it is intended. There is nothing in this combination analogous to Mr. Woodworth's mode of tongueing, unless it may be said that the two circular saws running upon a vertical shaft can be said to be analogous. And they could, in my opinion, do no more than to furnish the hint for Mr. Woodworth's improved cutters for tongueing. But M. Manneville seems to have invented and described a tool for cutting out grooves very similar, to say the least, to that claimed by Mr. Woodworth. He says in his specification, (I use the English translation annexed, marked exhibit C,) "for the same end [that is grooving] I likewise sometimes use a tool carrier mounted on a vertical axle. This tool carrier is armed with several irons resembling much those of plough planes, with the exception that they present themselves alternately in an opposite direction, and obliquely, to meet the wood which they cut out neatly."

In connexion with the mechanism above described, M. Manneville, in order to prevent the board from presenting to the tools any bend or warp, made use of a bearer, whose weight rested, by means of a roller, on the board at the place where it was about to be operated upon. He particularly describes this bearer, as will be seen on reference to the specification, and its mode of action, by which it would appear to be designed to keep the board in place, thus performing the office of a pressure roller, as set forth in the re-issued Woodworth patent. Thus there was a combination, in this machine of de Manneville, of mechanism for tongueing and grooving, and of a pressure roller or bearer to keep the board in place.

The planing machine of M. de Manneville is not represented by plates in this vol. (41st) of the Brevets d'Invention, above referred to, and is only generally described in the specification contained in that volume, (the English translation of which is annexed, see exhibit C.) In that specification he describes two pairs of vertical cylinders or rollers, one pair before the planing tool and the other behind; the board moving on its edge, borne on rollers placed horizontally. The boxes of one of the first pair of cylinders are made stationary, while those of the other are made to slide in grooves in accordance with the varying thickness of the board to be planed. This roller is pressed evenly and constantly upon the board by means of a weight or spring. They

thus correspond precisely with the feed or pressure rollers described in the re-issued Woodworth patent, and perform precisely the same office; that is, they feed the board to the planing tool, at the same time keeping it in its place, and adjusting themselves to its varying thickness. Besides the rollers already described, de Manneville's planing machine had another pair of cylinders or rollers at the end of the frame on the other side of the planing tool, but they were stationary in their boxes, because when the board reaches them it has undergone the whole operation and been brought down to its required thickness. This last pair of cylinders, therefore, are used to hold the board firmly in its place, but to guide it in coming out of the machine. Thus these different pairs of rollers, the two vertical pairs, as well as the horizontal rollers, seem to correspond in their offices precisely with the pressure and horizontal rollers described in the re-issued Woodworth patent.

The vertical cylinders appear to have been so geared as to perform another and most important office, viz., the gauging of the board so that it might be planed to the thickness required, which was a mere equivalent for the devices for the same purpose in the machines of Roguin and Woodworth.

The planes, however, used in M. Manneville's machine do not appear to be rotary. On the contrary, they were fixed in a carrier, which moved backwards and forwards, thus planing the board to a given thickness as it passed by the planes. Here, however, was the general or elementary principle of the combination contained in the Woodworth machine, or perhaps more properly speaking, the elements of that combination, viz., friction and feed rollers, a planing tool operating between them, and a device by which the required thickness of the board could be gauged. The introduction of the rotating planing cylinder as a substitute for the horizontal plane would undoubtedly be an improvement in this combination, but it could not, I think, change the essential elements and principle of that combination. It would add no new principle constituting a new combination, which would be a proper subject for a patent, although this new device introduced would involve a new element of motion and mode of operation in itself different from the reciprocating planes. Its application or substitution for the reciprocating planes alone could be patentable, if the device had never before been known, inasmuch as it would produce effects in operation which the reciprocating planes could not. But, in view of the fact that M. Roguin had before applied the rotating plane to the planing of boards, its subsequent application by any one could hardly be deemed a patentable improvement. Old Mr. Woodworth seems, judging from his original specification, to have been acquainted with the principal historical facts connected with the invention and improvement of the planing machine. The general combinations of mechanism, of which it was constituted, seem to have been familiar to him as old devices, and he therefore claimed improvements in the planing cylinder, and the cutters for tongueing, etc., with the application of the former to planing boards. He was mistaken only in the latter

claim. Rotating cutters had been employed even by Bentham, and he made them to revolve in the same direction with the progressive motion of the board, and also in a reverse direction; thus, in the first instance, causing them to cut from the unplaned to the planed surface of the board, and in the latter, from the planed to the unplaned surface. (See Repertory of Arts, vol. 10, page 303, before referred.) The mode of cutting, therefore, described in the Woodworth re-issued patent, was not new when Mr. Woodworth made his alleged improvements in the planing machine.

The mode of operation of the various machines which I have described compare as follows, viz.: In the original Woodworth machine, as described in the patent of December 27, 1828, the board was placed upon the carriage, and then set or gauged so that it might be reduced to the required thickness; it was then drawn along or advanced, by rack and pinion, or other mechanical equivalent to the planing cylinder, where it received the action of the latter. It was guided in its course by rollers, with stationary bearings, which could not exert any variable pressure upon the board, as there appears to have been in the original machine no device for that purpose; and as the cutters appear to be represented as revolving in the same direction of motion, and consequently cutting from the unplaned to the planed surface of the board, and, of course, against the solid bed of the machine, pressure rollers to keep the board from working into the centre of the planing cylinder seem not in this machine to have been necessary. In this machine both the bench or bed. upon or against which (if the machine be vertical) the carriage carrying the board rests, and the planing cylinder, are stationary in relation to each other; that is, there appears to be no device by which the one can be made to recede from or approach to each other, in order to gauge the thickness of the board, that function being performed on the carriage upon which the board is placed, by some device which is not fully explained in the specification nor represented in the drawings. The machine, as described in the re-issued patent, and figure 7, of the drawings annexed, has the additional device of the yielding pressure rollers, and also the device by which the planing cylinder and the bed or bench can be made to recede from or approach to each other for the purpose of gauging the thickness of the board. In this last form of the machine, the board is fed by a pair of friction or feed rollers, the upper one yielding to the inequalities of the board advancing towards the planing cylinder, which revolves in a direction contrary to the motion of the board, thus cutting from the planed to the unplaned surface, and with bearings so constructed as to admit of its being advanced to, or drawn from, the solid bed over which the board passes; this device being for the purpose of gauging the thickness of the board.

In M. Roguin's first machine there was also a carriage, on which the board was fastened and gauged so as to be planed to the required thickness; the carriage was then advanced towards the planing cylinder by a mechanical contrivance equivalent to the rack and pinion, or roll-

ers, described in Woodworth's original patent. The bed or bench, over which the carriage passed, was fixed and immoveable, and the planing clinder was also fixed in bearings, which were stationary in respect to the bed. There was also a cross bar, *x*, on that side of the planing cylinder towards which the board advanced, called a guide, whose office seems to have been to pass over the unplaned surface of the board, or the edges of the carriage, on which it was confined and gauged to an equal thickness, tending to confine and steady it, and prevented from being lifted up towards the centre of the cutter cylinder, although the board being confined to the carriage, such a device could hardly be very necessary in the operation of planing, when but a slight stratum of the board is removed. The planing cylinder in this machine appears to revolve in a direction contrary to the advancing motion of the board. Thus operating, this machine is, in my opinion, essentially the same as the original Woodworth machine in principle. Afterwards, M. Roguin substituted planing cutters, almost precisely the same in form as the planing cylinder of Woodworth; but in his new machine he caused his cutters, which were fixed in an iron frame sufficiently heavy to prevent them from being lifted from the board by their own action, to traverse over the board, the latter remaining fixed upon a stationary bed or platform, with a device, by which it could be elevated or depressed, and thus gauged, so as to be reduced to any given thickness. The only change in this improved machine was the new form of the planing blades, the motion of the tool over the board, instead of the motion of the board towards the cutting tool; one motion, in principle, being, I think, equivalent to the other.

In M. Manneville's machine there appears the precise device of feed or pressure rollers, which is set forth and described in Woodworth's reissued patent, the upper one, or that one of the first pair which were placed before the planing tool, yielding so as to meet the varying thickness of the unplaned board; and the other pair below the tool, with stationary bearings, the yielding ones being unnecessary after the board had been planed to an equal thickness. In this machine, the device for gauging the thickness of the board was different from that of Woodworth or Roguin. It was accomplished by gearing on the ends of the friction cylinders, and by rollers on the frame in which the tool carrier moved, which prevented the tool from cutting below the given plane to which the board was to be reduced. In this machine, the planes were not fixed upon cylinders as in Woodworth's and Roguin's machines, but they were fixed in a tool carrier, which moved backwards and forwards between the two pairs of friction rollers, thus reducing the board to the required thickness.

In my judgment, the combinations for planing, in all these machines, are essentially the same in all their elementary principles, particularly in the Roguin and Woodworth machines. In the machine of Manneville, there is a combination of devices for planing boards at one operation, but the planes have a reciprocating motion instead of rotary one. But although the general principle of the combination appears in this

machine, the substitution of rotating for reciprocating planes would be a change, producing a new mode of operation in that particular part of the combination, and some new effects. It would be an improvement in the planes, but not effect a change in the general principles of the combination, as a whole.

4. Answer to the fourth interrogatory. In Roguin's first machine he had rotating planes, but no pressure rollers, unless the cross bar *x* could perform that office, but that is not described nor represented in the drawings as having a vertical motion. In this machine, the board was confined to the carriage, on which it was gauged and moved, passing under the cross bar *x*, which rested upon the upper edges of the carriage, so that it could not work up towards the centre of the planing cylinder. This I regard as a mechanical equivalent for mere pressure rollers, such as the upper ones of the two pairs described in Woodworth's reissued patent, if it is not an analogous device. In M. Roguin's second machine, the board was fixed and gauged to the required thickness on a stationary bed, and the planing cylinder not only rotated, but was made to traverse from one end to the other of the board, and was held down to its work by the weight of its frame. This combination was, in my opinion, in principle, the mechanical equivalent for the combination of the rotating planes and pressure rollers, in the Woodworth machine, if it is not an analogous device. I regard, however, the two terms, viz., "mechanical equivalent" and "analogous device" as meaning the same thing. In the machine of M. Manneville, for tongueing and grooving, the tools rotated, and there was, in combination with them, a device, by means of a bed of the second order, with a roller at its bearing point, by which the board was prevented from presenting any warp or bend to the cutting tools. This was a combination of rotating cutting tools with a pressure roller, and although not in form, the same as the combination of Woodworth, as set forth in the reissued patent, it was in principle. In the planing machine of M. Manneville, there appears to be no combination of pressure rollers with rotating cutters. In that machine, the cutters, instead of rotating, move longitudinally or laterally.

5. Answer to the fifth interrogatory. In my judgment, a mechanic, skilled in planing machines, could, by the aid of the French patents, make the Woodworth machine, or one substantially like it, without invention. In the French patents, he would find all the elements of the combinations in the Woodworth patents, and the substantial combinations themselves.

6. Answer to the sixth interrogatory. I am acquainted with the patent, granted by the United States of America to Nicholas G. Norcross, on the twelfth day of February, A. D. 1850, for an improved planing machine. I have also seen the model of said machine, which was deposited by him in the Patent office previous to the issue of his patent, which, as I understood it, was made in accordance with his patent. I have also seen two machines, at least, made in accordance with his patent, one of which was in Brattleborough, Vermont, and the other in

Lowell, Massachusetts. The latter I saw in operation. I am also acquainted with the said reissued Woodworth patent. I do not recollect of having seen a model made in accordance thereto, but I have seen a machine called the Woodworth planing machine. I have seen it recently in operation in this city. It corresponds with the description and representation in figure 7 of the drawings of the reissued Woodworth patent. I think the essential combinations of mechanism in the Norcross machine is substantially different in principle from the essential combination of mechanism in the Woodworth machine. It has some additional parts, which produce effects which the Woodworth machine cannot produce. They have some things in common. The Woodworth machine has a stationary bed, over which the board passes, and by which it is supported, in the operation of being planed. The Norcross machine has also a bed or bench, over which the board passes, and by which it is supported in the operation of being planed. The Woodworth machine has a planing cylinder, on which the planing cutters or blades are fixed, and by which they are revolved. The Norcross has also a planing cylinder of a like character. The Woodworth machine has a pair of feed rollers; so has the Norcross machine, and so also had that of M. Manneville. These devices are common to both of them; but here the resemblance, or community of devices, ceases. In the Woodworth machine, as now constructed, the planing cylinder revolves above the board, and directly over the bench, over which the board passes, and in a direction contrary to the advancing motion of the board, thus cutting upwards from the planed to the unplaned surface. Revolving in this direction, they have a tendency to lift up the board towards the centre of the planing cylinder. This renders necessary pressure rollers on each side, to prevent such tendency. In the Norcross machine, there are no such rollers performing such an office, nor is there need of any. In that machine the planing cylinder revolves under the board. Its direction of revolution is like the planing cylinder in the Woodworth machine, the reverse of the advancing motion of the board, and therefore, like the Woodworth planes, it cuts from the planed to the unplaned surface of the board, but it cuts downwards towards the anterior portion of the bench B, described in the patent of Norcross, which prevents the board from being drawn by the action of the cutters towards the centre of the planing cylinder, and also presents a firmer resistance to the stroke of the planes than the pressure rollers in the Woodworth machine. This part of the bench, therefore, performs this function of the pressure rollers in the Woodworth machine. Thus, in this arrangement of the mechanism, the pressure rollers for such a purpose may be dispensed with. But there is another device in the Norcross machine, which is not to be found in that of Woodworth, and that device is the rest *f*, represented in the drawings attached to Norcross's patent. This is made of iron or wood, and is slightly curved on the under side, and projects slightly over that part of the bench marked B, and over the planing cylinder. This device introduces a new principle, or element,

into the combination, which is not found in the Woodworth machine, thus making it a new combination, and, of course, not infringing the Woodworth machine. This rest is fixed in a frame with the planing cylinder, which, by the mechanism described in Norcross' specification, is made to have a vertical motion, the rest and the cylinder constantly retaining the same relative distance from each other, thus gauging the board to an equal thickness, and thus adapting themselves to its varying thickness. The weight of the cylinder and the rest bearing upon the board, borne down, if need be, by superadded weights, spiral springs, or some similar device, has a tendency to slightly curve the latter, thus causing it to describe an arc corresponding, or approximating rather, to the periphery of the circle, described by the revolution of the planing cylinder. The effect of this action upon the board is to compress the fibres of the under surface, thus preventing them from being lifted by the action of the cutters, and also preventing the knots from being torn out. In consequence, also, of this curve of the board, the planes cut nearly in a straight line, by which I mean lengthwise, and parallel to the unplaned side of the board, thus making a smooth surface. Thus, this rest in the Norcross machine produces two very desirable effects; 1st, to prevent the fibres of the board from being torn off and splintered, and its knots from being torn out; and 2d, to make a smooth and even planed surface.

These effects the Woodworth machine cannot produce. It has no device by which they can be produced. On the contrary, it produces effects precisely the reverse. As I have many times before said, the action of the cutters striking upwards from the planed to the unplaned surface, tends to draw the board towards the centre of the planing cylinder, by which action it would be cut in two or greatly damaged. To prevent this action for all practical purposes, the Woodworth machine is provided with pressure rollers. These rollers, in connexion with the lifting action of the cutters, tend to curve the board upwards towards the cutters, instead of compelling it to describe a curve approximating to the periphery of the circle described by the revolution of the planing cylinder, thus keeping its surface equidistant from the cutters, as in the Norcross machine. The effects thus produced are precisely the reverse of the effects produced by the rest and its appendages in the Norcross machine. They are, first, the loosening of the fibres and knots, causing the board to be splintered and the knots to be torn out, in very shaky and knotty lumber; and, second, causing the planed surface of the board to be uneven or full of little ridges, both of which are objectionable, and to be avoided if possible.

Thus, the rest and its appendages is a device in the Norcross machine not to be found in the Woodworth machine, and producing effects which the Woodworth machine cannot produce, thereby implying the addition of a new principle or element in the combination of mechanism, which constitutes the machine, and therefore making it a new combination.

But there is another difference to be remarked. In the Woodworth

machine, as described in the reissued patent and as now constructed, the method of gauging the thickness to which the board is to be reduced, is by a device by which the planing cylinder and the bed can be made to approach to, and recede from, each other. In the Norcross patent there is no such device by which the planing cylinder and the bed can be made to approach to, and recede from, each other. The bed remains stationary, but the plaining cylinder and the rest are, by a device described in the patent, made to recede from, and approach to, each other, for the purpose of gauging the thickness to which the board is to be reduced.

And here it may be remarked, that the rest *f*, in the Norcross machine, is not a substitute for the pressure rollers in the Woodworth machine, nor does it perform their particular functions, except so far as to aid in confining the board while it is being planed. If the rest were not there the board could not be drawn towards the centre of the planing cylinder by the action of the cutters, that would be prevented by the bench B; but, without the rest, the board could not be gauged so as to be planed to an equal thickness, nor could it be curved so as to compress its fibres and confine its knots when receiving the action of the cutters, thus preventing it from being splintered, having the knots drawn out, and thereby securing smooth work.

The rest in the Norcross machine performs another function which I have not named, viz., it aids in preventing the vibration of the board while receiving the action of the cutters. This was partially, but not wholly, done by the friction rollers in the Woodworth machine.

7. Answer to the seventh interrogatory: The device in the Norcross machine, for keeping the board in place while planing, is the rest *f*, and its appendages; that is, the planing cylinder and the frame in which they were fixed, and additional weights, if necessary, in connexion with the bed B. I do not think this device is substantially the same in its structure and mode of operation as the rollers in the Woodworth machine, for the reasons particularly stated in my preceding answer. This device not only kept the board in place, but it performed functions, and produced effects, which the rollers, in connexion with the bench in the Woodworth machine, could not perform nor produce.

8. Answer to the eighth interrogatory: The Norcross machine has no combination of rotating planes with rollers—pressure rollers, I presume, the question implies—nor in my judgment any device analogous to them. The combination of mechanism in the Norcross machine, including the rotating planes, includes in substance not only the combination of rotating planes with pressure rollers in the Woodworth machine, but it includes much more, producing effects which the latter cannot produce, as I have before stated.

9. Answer to the ninth interrogatory: In my opinion the Norcross machine contains no combinations precisely and substantially the same as those claimed in the Woodworth patent of 1845.

10. Answer to the tenth interrogatory: In the Norcross machine it is the bench B, and in the Woodworth machine the pressure rollers *f*, *f*,

prevent the rotating planes from drawing the board out of its line of motion and on to the cutters.

11. Answer to the eleventh interrogatory: In my opinion there is a substantial difference in structure and mode of operation between the solid bench, against which the rotating planes cut in the Norcross machine, and the pressure rollers in the Woodworth machine. I consider the bench the best, and my reasons for this opinion are the following: The bench in the Norcross machine is solid and cannot yield, or be materially affected by the stroke of the rotating cutters, and it thus prevents the vibration of the board. The edges of the planes, also, in their revolutions, approach nearer to the bench in the Norcross machine than they do to the pressure rollers in the Woodworth machine, thus tending to prevent the tearing up of the fibres of the board. In the Woodworth machine the pressure rollers, and particularly that one towards which the planes rotate, must necessarily be so fixed in their bearings as to have an upward and downward motion, in order to adapt themselves to the varying thickness of the board; they must also be fixed at a further distance from the revolving edges of the cutters than in the Norcross machine. They therefore cannot present that firm and unyielding resistance to the stroke of the cutters which would be exerted by the solid bench in the Norcross machine; nor can they prevent the tearing up the fibres of the board, as does this bench in the Norcross machine; nor, if the bearings of the rollers in the Woodworth machine were stationary, and admitted of no vertical motion, would they present the same firm and efficient resistance to the action of the rotating cutters as would be presented by the solid bench in the Norcross machine; and, consequently, they could not so efficiently aid in preventing the vibration of the board while being planed.

12. Answer to the twelfth interrogatory: If by "moveable cylinder," the upper feed roller G, in the Norcross machine, is intended, then I think the combination of that, with the fixed bed B, is substantially different in structure and mode of operation from the combination of the fixed cylinder, with the pressure roller, in the Woodworth machine. Of course the structure or form of the bed B, in the Norcross machine, is different from the fixed cylinder in the Woodworth machine, and their mode of operation is also different. In the Norcross machine the fixed bed B, and the moveable cylinder G, can concur with, or aid each other, only in keeping the board steady, and that they could not do effectually without other aid. Whereas, in the Woodworth machine, the fixed cylinder and the pressure roller, not only help each other to keep the board steady, but to feed it to the rotating planes.

EDMUND BURKE.

Subscribed and sworn to before me,

B. F. HALLETT,
Commissioner circuit court United States,
for Massachusetts district.

Cross interrogatories.

And, in answer to the foregoing cross interrogatories, propounded on behalf of the complainants, the deponent answers and says:

1. In answer to the first cross interrogatory: I have given depositions and affidavits, under the circumstances implied in the interrogatory, in which I have expressed opinions on questions of novelty, originality, and infringement, in connexion with the Woodworth patent. I believe I have given four such affidavits and depositions. The first one was dated February 12, 1850. I believe that was the first; the precise dates of the others I do not recollect. I think, however, that the second was given in the spring, or early in the summer, of 1850; the third late in the summer, or early in the fall, of 1850; and the fourth, which was a deposition given before a commissioner in Boston, was in the latter part of the fall, or early in the winter, of the same year. Having no memoranda of the dates of these several affidavits, or depositions, with me, I cannot even state precisely the months in which I gave them. They were all in writing. The two first were written by myself; the third was a copy of the second, which I subscribed and made oath to; and the third was written by me, I think entirely, in answer to interrogatories propounded through the commissioner before whom it was taken.

2. In answer to the second cross interrogatory: The first affidavit which I gave, and which bears date February 12, 1850, I gave at the request of Nicholas G. Norcross, who said that he desired it for the purpose of preventing an injunction which was applied for, or which he expected would be applied for, to prevent the use of his machine. He did not say that he intended to publish it; nor did I expect that it would be published, or know that it was published, until I saw it, with the affidavits of other persons, in a pamphlet, containing a description of his machine. The second I gave at the request of Mr. Hubbell, of Philadelphia, who said it was to be used in a suit pending in Raleigh, North Carolina. He did not, as I remember, state the names of the parties, and gave me no information respecting the suit, further than it was concerning the Woodworth patent. The next I gave also at Mr. Hubbell's written request, expressed in a letter, to be used, as I understood, in a suit or other legal or equitable proceeding in Philadelphia. The fourth, and last, was taken by Mr. Hubbell before the honorable Edward G. Loring, U. S. commisssioner, of the city of Boston, and was, as I understood, to be used in the suit pending in North Carolina, before referred to. All these affidavits, or depositions, were ex parte. Certainly the adverse parties were not present; nor were they notified, in either instance, of the taking of my affidavits, to my knowledge. The dates of these several affidavits, as nearly as I can fix them, I have given in my previous answer; and the purposes for which I unstood them to be taken, and the persons at whose request they were given, I have also stated above in this answer.

3. Answer to the third cross interrogatory. I first examined the

record in the Patent office, and the drawing, also in that office, purporting to be the specification and drawing annexed to the original patent of William Woodworth. At what particular dates I examined them I cannot remember; but it was several times while I held the office of commissioner of patents. I have examined them once, at least, since I was removed from that office, in the Patent office, in the spring or summer of 1850; the precise time I cannot remember. Upon that record and drawing I put no mark, they being public records. When my deposition was taken before Commissioner Loring, (which I now recollect was in the latter part of October, from the circumstance that it was at the time of the first attempt to arrest the fugitive slave Crafts,) a certified copy from the Patent office of the original Woodworth patent *office* was used, I am pretty confident. If so, it is one of the exhibits annexed to the deposition, and bears my signature as the means of identification. I have, also, in giving my answers to the interrogatories in this commission, referred to another certified copy from the Patent office of the original Woodworth patent, which also bears my signature as the means of identification, and is marked exhibit B. From what I have stated, it will appear that I never examined the original patent and specification of William Woodworth, but only the record of the original specification, and certified office copies of the original patent and specification.

4. Answer to the fourth cross interrogatory. I believe I have answered this interrogatory in my answer to the third cross interrogatory, to which I refer for the answer to this.

5. Answer to the fifth cross interrogatory. I do not know that I ever saw a model of the original machine of William Woodworth, and certain it is, I never saw the original machine itself. The opinions which I have expressed in the affidavits and depositions, above referred to, and in the deposition which I am now giving, concerning the Woodworth planing machines, are formed from the specifications and drawings annexed to the original patent, and the specifications and drawings annexed to the reissued patent; or rather, certified office copies of them, one of each of which I have signed with my signature, and marked them as exhibits A and B. My signature is my means of identification.

6. Answer to the sixth cross interrogatory. I find in the machine, as represented in the copy of the original drawing, attached to the copy of the original patent of William Woodworth, marked exhibit B, bearing my signature, three devices, at least, the combination of which is claimed in the reissued patent. Those three devices are the rotating planes, the cutter wheel for tongueing, and the cutter wheel for grooving. All of these devices are claimed in one combination in the second claim of the reissued patent, for planing, tongueing, and grooving, at one operation. In the third claim of the reissued patent, the tongueing and grooving cutter wheels are claimed in one combination, for the purpose of tongueing and grooving at one operation. The exhibit B, above mentioned, to which the drawing, from which I now testify, is attached, bears my signature, and may be thus identified.

7. Answer to the seventh cross interrogatory. I never saw any of the original machines of said Woodworth, before the year 1829, and therefore cannot answer the first question in this interrogatory. In answer to the second question in this interrogatory, I cannot say that I ever particularly examined the model of the machine filed in the Patent office, at or prior to the issue of the original letters patent. Nor have I ever made a model of any of said Woodworth's machines set in use, prior to the year 1829. Nor have I ever compared any model with such machines. I know nothing about the machines which he made, and set in use, prior to the year 1829; that is, from actual inspection or examination.

8. Answer to the eighth cross interrogatory. In the copy of the original drawing, attached to the copy of the original patent, marked exhibit B, the rollers, *f*, *f*, *f*, which bear a resemblance to the pressure rollers described and represented in the reissued patent, are represented as vertical. The one at the end of the machine, where the board and its carriage are delivered from the machine, appears to have both ends of its shaft confined in fixed bearings, which admit of none but a rotary motion. The other two rollers, one on each side of the planing cylinder, appear to have their lower ends of their shafts confined in fixed bearings, admitting of none but a rotary motion. If there is a device, by which they are made to have a lateral motion, (or vertical when the machine is horizontal,) it does not appear in the copy of the original drawings, above referred to, nor is it described or alluded to in the copy of the original specification annexed to the drawing, to which I now refer. In this drawing, from the apparent position of the edges of the cutters, I infer, that the planes rotated in the direction of the advancing motion of the board; if so, the pressure rollers could not be needed to prevent the board from working up towards the centre of the planing cylinder, inasmuch as the carriage and board rested on a solid bed in the horizontal machine, (the solid frame work in the vertical,) and particularly they could not be necessary for such a purpose in the horizontal machine, if the direction of the cutters be as I suppose they were, judging from the representation in the drawing. If I am right in these conclusions, the first claim in the reissued patent, embracing the combination of the rotating planes and pressure rollers, as described in that patent, and for the purposes set forth in the specification and final claim of that patent, are not to be found in the original machine. The device of pressure rollers moving vertically, as well as rotating, is wanting in the original machine. Also, the direction of the rotation of the planes in respect to the motion of the board is different. Besides, one of the devices for gauging the thickness to which the board was to be reduced, or rather two of them, described in the reissued patent, and contained in the Woodworth machines as now constructed, is different from the device for the same purpose mentioned in the original specification. According to the latter, the thickness of the board was to be gauged by a contrivance on the carriage. This device is merely alluded to in the original specification, and two others described, one of which

was by making the bed piece moveable to and from the cutters, and the other was making the cutters moveable to and from the bed piece. This latter is the device used in practice. My only means of comparison of these several devices are the copies of the original and reissued patents, and the drawings attached, marked exhibits A and B, both of which bear my signature as means of identification. Some of the devices alluded to are not, however, claimed in the reissued patent. The reissued patent of Woodworth describes many devices which it does not claim.

In answer to the last clause of this interrogatory I would remark, that I do not profess to be an expert, experienced or otherwise, and I profess to have no uncommon opportunities of acquiring a knowledge of machines and inventions than those to which I have particularly referred in my answer to the first interrogatory in chief. In my opinion, a model truly representing a machine is very useful and very necessary to illustrate it, if it be at all complicated or intricate. But I do not consider such to be the character of any planing machine which I have ever examined. On the contrary, I think these individual devices, and the combination of one or more of these individual or single devices, are plain and simple, and may be comprehended without much difficulty by any person possessing an usual share of intelligence, with a little experience in the examination of machines.

9. Answer to the ninth cross interrogatory. It is one of the purposes stated in the original Woodworth patent to reduce a board to an equal thickness. I think I can point out a mode of reducing plank to an equal thickness, by means of rotating planes, without these equivalents for making pressure on that face of the plank which is being planed. The plank being gauged on the carriage, as Woodworth states, it can be done by merely causing the planes to rotate in the same direction with the advancing motion of the plank, as Woodworth himself appears to have contemplated and actually done in his original machine, if his original drawings represented his invention truly. Revolving in this direction, the planes cut from the outer or unplaned surface to the inner or planed surface. They thus cut towards the solid bed on which the carriage moving the plank, or the plank without the carriage advanced by feed rollers, rests, in the operation of being planed. Moreover, the planes of Woodworth, and also those in the improved machine of Roguin, are so situated as to cut the plank in a line nearly tangent to the circumference of the circle described by the revolution of the cutters. Therefore, their action could not tend much, if any, to lift the plank towards the centre of the planing cylinder, which it is the office of the pressure rollers to prevent. That tendency could, sufficiently for all practical purposes, be prevented by the device in Roguin's machine, of confining the board to the carriage by claws and clamps as he describes. Woodworth himself, in his original specification, evidently contemplated some similar device by which the board was confined on the carriage, and gauged to the thickness required, although he does not describe it. I am not skilled in drawing, and I think the device I have pointed out so simple as to need no such illustration to be understood

by persons of ordinary intelligence. I will add, that I do not well see how the board could be drawn through the machine on a carriage moved by a rack and pinion, as represented in the copy of the original drawings of the first Woodworth patent, unless it was in some mode confined to the carriage. If it were not so confined, pressure rollers bearing against it with any considerable pressure, would, I should think, cause the carriage to slip away and leave the board.

10. Answer to the tenth cross interrogatory. I do find in the drawings of the Woodworth patent of 1828, the representation of rollers on each side of the planing cylinder, and on that face of the plank to be planed, but they have no corresponding cylinders opposite to them as represented in fig. 7, of the drawings of the reissued patent. I do not think the machine would have worked so successfully as it now does, if the first roller, that is, the one passing over theunplaned part of the face of the plank to be planed, if it were not made self-adapting to the varying thickness of the plank, but no device providing for such self-adaptation appears in the drawings or description of the patent of 1828, and none is therein claimed by William Woodworth as his invention. The other rollers need not have this self-adaptation, or the pressure principle, inasmuch as they pass over the plank after it has been reduced to the thickness required. This device, however, and for the very same purpose, is found in the machine of Manneville, and also its equivalent in the machines of Roguin. In the former it appears to be the very same device now used for the same purpose in the Woodworth machine. It is also described in the Norcross patent as a device in Hill's machine, and for the same purpose, viz., adapting itself to the varying thickness of the board as it is *feed* to the planes. In any machine in which the board is fed to the planes by friction or feed rollers, this very device must exist. It must, it seems to me, suggest itself to any intelligent mechanic constructing such a machine, without invention, who has ever seen friction or feed rollers for any purpose. It is an old device in mechanism.

11. Answer to the eleventh cross interrogatory. I have never seen the original patents granted in France to Mr. Roguin, on the 17th of March, 1817, and 30th March, 1818; nor the patent granted on the 9th of March, 1825, with additions on the 28th of April, 1825, to Mr. Manneville. Nor have I seen authenticated copies thereof, granted by the Government of France. The copies of those patents, with the additions which I have seen, are hereto annexed, marked exhibit C, and referred to in this deposition, purport to be copies of the patents or descriptions of the machines of Messrs. Roguin and Manneville, contained in the French work entitled "Brevets d' Invention," translated into the English language. I have several times examined various volumes of said work. I purchased it for the Patent office while I was commissioner. I have also examined the volumes containing the descriptions of the French patents above mentioned, and the plates representing the machines described in those patents. I read the French language as it appears in the ordinary French literature tolerably well.

I have made one or two translations from the French language for the Washington Union while I was one its editors. But I am not familiar with French technological terms as applied to science or practical mechanics. In testifying so far I have relied on the translations, and on the plates contained in the French work above mentioned, representing the machines of Messrs. Roguin and Manneville. I have no knowledge of the dates of said patents, other than the work referred to. The volume (23) of that work, describing the machines of Mr. Roguin is dated 1832. The volume (41st) of the same work, containing the description of the machines of Mr. Manneville, appears to have no date in its title page.

12. Answer to the twelfth cross interrogatory. I have no knowledge of the year when the said printed work, referred to in the third direct interrogatory, was published, other than the evidence contained in the work itself.

13. Answer to the thirteenth cross interrogatory. In Roguin's first machine I find a combination almost, if not quite, precisely the same as in the Woodworth patent of December 27, 1828. I find in that machine a frame, a carriage, on which the board is gauged to the required thickness, and moved towards the rotating planes; I find rotating planes, and a cross bar, called a guide, passing over or above the frame of the carriage, preceding the planes in the advance of the board towards them, corresponding to the first roller, which precedes the advance of the board to the planes in the original Woodworth machine. It appears to have no device by which it would possess the faculty of self-adaptation to the varying thickness of the board to be planed. Nor has, apparently, the roller corresponding to this guide, in the original Woodworth machine, as represented by the drawings. In my answer to the tenth cross interrogatory, I have said that I am of the opinion that the roller referred to in the Woodworth machine must have a device, giving that power of self-adaptation, in order to work successfully on planks of varying thickness, although it did not appear in the drawing of it. It must have had such a device if it actually pressed upon the surface of the board. I should express the same opinion with regard to the cross bar in Roguin's machine, if it really performed the office of a guide, and rested on the face of the plank to be planed. It would not have been, I think, absolutely necessary that the cross bar, or guide *x*, in Roguin's first machine, should have had a vertical motion, thus giving it a power of self-adaptation to the varying thickness of the board to be planed, if the board was fixed sufficiently low upon the bed of the carriage as to allow its inequalities to pass under the cross bar without interfering with it. In Roguin's first machine the cross bar, as well as a portion of the extremities of the shaft bearing the tools, appears to rest upon the frame of the carriage, and thus they keep the carriage with the board down, and prevent it from working up towards the centre of the planing cylinder, performing precisely the office of the pressure rollers in the present Woodworth machine. The use and necessity of pressure rollers, as I have before remarked, in substance,

depends very much upon the direction of the rotation of the planes in relation to the advancing motion of the board, that is, when keeping the board from being lifted up by the cutters, is regarded as their most important function. If my conclusion, in reference to the office and use of the guide x, in Roguin's machine, (and it is a mere inference, like my conclusion expressed in my answer to the tenth cross interrogatory,) is correct, then Roguin's machine would contain substantially the same combination as in the Woodworth patent of July 8, 1845, if that had pressure rollers, possessing the faculty of self-adaptation to the varying thickness of the board. The placing of a guide behind the cylinder would be but a repetition of the same device, but that was unnecessary by the confinement of the board upon the carriage, which prevented its being lifted up towards the centre of the planing cylinder, which was an equivalent device for the rollers in the modern Woodworth machine, placed behind the planes, and passing over the planed surface of the board. Considering that, namely, the prevention of the tendency of the board to be lifted up towards the centre of the planing cylinder, the important and essential advantage gained by the combination of pressure rollers with the rotating cutters, as set forth in the specification, and first and fourth claim, in the reissued Woodworth patent of July 8, 1845, then, in my opinion, the very principle of that combination is to be found in the combination of the rotating cutters, with their cylinder revolving over, and apparently in contact, or nearly so, with the upper part of the carriage frame and the cross bar x, also passing over that part of the frame, and evidently in contact with it. This device would certainly perform the very function which the pressure rollers, described in Woodworth's patent of July 8, 1845, perform. Holding down the carriage, upon which the board was fixed and gauged, it would of course hold down the board from working up towards the centre of the planing cylinder. If the cross bar x traversed over the face of the board, instead of the straight and even sides of the carriage, it would then be necessary to give it the means of self-adaptation to the varying thickness of the board; but that is a function different from keeping the board from being lifted to the centre of the planing cylinder, which is the grand principle in the Woodworth combination, as set forth in the re-issued patent. It is a function common to all feed rollers, feeding an unyielding substance to a machine, and is to be found distinctly set forth in the description of M. Manneville's patent. That function I do not regard as an essential element in the Woodworth combination, nor is it claimed as such in the reissued patent.

Again, in Roguin's second machine, there appears a combination, in principle, very like the combination set forth in the first claim of the reissued Woodworth patent. In that machine, the board is fixed firmly upon a bed, having a device, by which it may be raised or depressed, and thus gauged to the thickness required. As appears by fig. 8, plate 28, vol. 43, of the "Brevets d'Invention," the board is placed a little below the upper edges of the frame, on which the rotating planes

traverse, sufficiently so, apparently, to allow its inequalities of surface and thickness to pass under the guide *g*, corresponding to the cross bar *x*, in the first machine. In this machine, the rotating planes are fixed in a carriage, with the guide *g* attached to its posterior portion, by which, with the aid of the mechanical devices connected with it, the carriage is impelled longitudinally over the surface of the board. This carriage, bearing the tool, evidently rests at its two extremities on the edges of the frame, and thus it is prevented from advancing towards the board further than a given distance. The carriage and the tool are to be of sufficient weight to keep the tool constantly down to its work, and prevent it from being lifted by the board by the action of the cutters. This combination seems to embody the principle of the Woodworth combination in a different form. I think it can make no difference in principle, whether the board be made to advance to stationary rotating planes, or whether the planes be made to traverse the board, the latter remaining stationary. Nor can it, in my judgment, change the principle of the group or combination of mechanical devices, whether the planes rotate in the direction of the advancing motion of the board, or the reverse. In the first instance, the planes cutting at an angle towards the solid bed, pressure rollers, with the functions claimed for them in the Woodworth reissued patent, would not be necessary. With the cutters, rotating in the contrary direction, they would be, or some equivalent device.

Thus explaining the reasons of my opinion, I think essentially the same combinations are found in Mr. Roguin's patents as are described and claimed in the first claim of the reissued Woodworth patent of July 8, 1845. The substitution of the rotating planes for the reciprocal planes in Manneville's machine, would make a combination precisely like that set forth in the first claim in the reissued Woodworth patent, and, to make that substitution, would hardly require a particle of invention.

14. Answer to the fourteenth cross interrogatory. I have already, in substance, answered the first question in this interrogatory, in my answer to the preceding interrogatory. In the translation annexed, marked exhibit C, and in plates 27 and 28, in the 23d volume of the "Brevets d'Invention," will be found descriptions and representations of the frame of the machine, (*a*, fig. 1 and 2, plate 27,) the carriage (*b*, fig. 2 and 3, plate 27,) on which the board is fixed and gauged, with the devices for gauging it. The rotating tools and planes, (*n*, fig. 4, plate 27,) the cross bar *x*, (plate 27,) and the guide *g*, (plate 28.) In plate 28, there is no moveable carriage on which the board is carried to the cutters. On the contrary, the board is placed on a fixed bench or table, marked *k*, with devices, which will admit of its being raised or depressed, in order to gauge the thickness of the board. The carriage in this drawing is the frame and its appendage, in which the tool is carried, marked *f*, in figures 6 and 9. From these descriptions and representations my conclusions are drawn. The combination is not claimed literally and pro forma as in the reissued Woodworth pa-

tent, nor is there a single claim in Mr. Roguin's patent set forth technically; but the devices for like purposes, and producing like effects, as those in the Woodworth reissued patent, are in those descriptions and representations.

In the description of the patent of March 15, 1817, I do not find any mention made of dogs or clamps for securing the plank to the carriage. Nor are they represented in any of the figures in plate 27 of the "Brevets d'Invention, vol. 23. The subject of confining the board is spoken of as though it were to be done by the common and usual mechanical devices, just as in the original patent of Woodworth, in which he speaks of gauging the thickness of the board on the carriage, and yet describes no device by which it may be done. The inference in both cases is, that it should be done in the common and usual methods of doing such things. Nor is the moveable floor, on which the board is placed in the carriage, described in the patent of March 15, 1817, represented in plate 27 of the work above referred to.

In the first machine of M. Roguin, described in the work above referred to, as the one patented March 15, 1817, the cylinder or rotating instrument for reducing the face of the plank appears to be formed with cutting edges cut out of a solid piece of metal. I do not now recollect the precise form of the teeth of a bur, but my recollection is, that they stand out on the circular plate on which they are formed with the same angle on each side. The edges of the planes in the first machine of Roguin's appear to be different. Their under or cutting side appears to be perpendicular to the axis of rotation. The angle on their upper side appears to be nearly tangent to the circle on which they are represented in fig. 4, plate 27, letter *n*, of the work above referred to, thus making these points or edges much more acute than the burr, and approximating to the former of the more improved planes. But in the patent of addition granted to M. Roguin, March 30, 1818, the edges of the rotating planes represented in fig. 7, plate 28, of the "Brevets d'Invention," 23d vol., are not cut out of a solid block or cylinder of metal. They are made in pieces separate from the cylinder on which they rotate, and are confined to their sockets or places by means of screws. They very nearly resemble the Woodworth planing cutters; so nearly indeed, that the latter could hardly be deemed a very perceptible improvement upon them. If, however, the planes of Woodworth were an improvement, that improvement would be the proper subject of a patent in itself, but it could not alter the principle of the combination of rotating cutters with devices for keeping the board from being lifted up towards the centre of the cylinder on which they revolved. And such seemed to be the view which Mr. Woodworth took of the subject in his patent of 1828, in which he claimed only the improvements in the planing cutter wheels, and their application thus improved to planing boards, etc.

Besides the cutters, I do not find in the French patent of 1817 any thing described or represented as passing or lying over and in contact with the surface of the plank to be planed, other than a cross piece

marked with the letter x, called a guide. The office and mode of operation of that cross piece I have already explained in my previous answers, as I understand it.

I do not find in the French patent of 1817 any cross piece or guide, excepting the one represented by the letter x, on that side of the rotating cutters towards which the board advances. With that cross piece and the shaft on which the cutters are fixed bearing upon the upper edges of the carriage, (as appears probable, from the description and drawing,) I should think it would answer a tolerably practical purpose, quite as practical purpose as the Woodworth machine, if constructed according to the original Woodworth patent of 1828. And even if the shaft did not bear on the upper edges of the carriage, its own weight holding the board steady in connexion with the cross piece x, exerting the same tendency, would enable it to work practically in my opinion. It might do its work a little less perfectly than the modern Woodworth machine, as that does its work a little less perfectly than that of Mr. Norcross. With the improved cutters of Roguin I think it would do its work much better than with those which he first used.

In the patent of March 30, 1818, I find rotating cutters, but not combined with a pressure roller. I think it is combined with equivalent devices, which I have fully pointed out in a previous answer. I find a cross piece g, in the French patent of 1818, but I do not find from the descriptions or drawings that it is self-adjusting to the thickness of the plank. It is placed posterior to the frame or carriage which bears the cutters, and if I correctly understand the direction of the traversing motion of the cutters, it passes over or above the planed surface of the plank, and of course has no need of a self-adjusting faculty. The said cross piece, or guide g, is represented as permanently attached to the same carriage with the planing cylinder, and that carriage moving on the frame from end to end of the plank which rests on table k, (see a cross section in fig. 8, plate 28, vol. 23d, Brevets d' Invention,) and not on the main frame, as the question seems to imply.

It is stated in said specification that the weight of the carriage, with the tool which it carries, should be about one hundred and ten kilogrammes, which is about 200 pounds; and the specification also adds, that "it is requisite that the carriage should be sufficiently heavy not to be lifted up by the effort made by the tool upon the wood; an effort, however, much less considerable in this than in the former machine; in it the tool was perpendicular with the axis, while the bevel of the new tool is almost tangent to the circumference." Thus the inventor contemplated increasing the weight of the carriage to any amount necessary to prevent it from being lifted up by the effort of the tool upon the wood.

I do not see why a practical working machine could not be made on this plan. And if a weight of 200 pounds would not hold down the tool more could be added, as contemplated by the inventor.

If the planing cylinder *were* hung in the frame with the guide, at-

tached at a point at which the frame and guide would be balanced, or nearly so, they both would be likely to be lifted from the plank together, if they yielded at all, and thus they would be likely to plane the plank to a varying instead of an equal thickness. But the planing cylinder seems not to have been so hung as to balance the carriage with the cross piece *g*, attached, and therefore would be less likely to produce the effect spoken of. If kept down by weights, or by its own weight constantly to the plank, it could not produce that effect, to wit, plane the plank to an unequal thickness.

15. Answer to the fifteenth cross interrogatory. In my answer to the fourth direct interrogatory I have not stated that, in the French patent of Manneville, granted March 9th, 1825, and the additions thereto granted, April 28th, 1825, I find the combination of a planing cylinder with pressure rollers, or their equivalents. I find in his tongueing and grooving machine rotary cutting tools, in combination with a pressure roller.

It is stated in said Manneville's first patent that the plank to be tongued and grooved is to be securely adjusted on a carriage, that carriage he causes to progress through conductors, admitting of no deviation of the roll as in the specification. I do not understand the pressure roller to be used to aid in securely adjusting the plank to the carriage. I understand from the description which the inventor gives of it, that its office is to pass over or rest upon that portion of the board about to be operated upon, for the purpose of preventing any bend or warp which may be in it, from presenting itself to the tools. It is, of course, used in connexion with the carriage. I have explained the construction of the mechanism by which this roller is to be applied, in my answer to the 4th direct interrogatory. The mode of its application is as I have stated, viz: it is made by means of the lever and weight to which it is attached, to press upon and pass over the part of the board just before the tools are to operate upon it. It thus holds down the warped part of the board and steadies it for the action of the cutters, thereby performing a function very like, if not precisely the same, which the pressure rollers of the Woodworth machine perform. I do not think a machine with but one such pressure roller, and with no other means of confining and keeping the board to the carriage, and with no conductors for keeping the carriage from vibration, would be likely to work very well in practice.

The mode of tongueing and grooving is by means of circular saws, five saws being used for the tongue and three for the groove, with reciprocating cutters for finishing the groove, including the saws for jointing the board. The inventor, however, describes a grooving wheel with cutters, somewhat analogous to Woodworth's cutters for grooving, which appears to be represented by the letter *u*, figure 2, plate 12, 41st volume of the work above referred to. I do not think this mode of tongueing and grooving precisely similar to Woodworth's; or, perhaps, I should be more correct in saying, that it involved the principle of rotating cutters or saws, in combination with a pressure roller, for such

would be the mode of operation, and more especially when Manneville used the tool carrier mounted on a vertical axle, of which he speaks in his specification, which is the leading principle of the Woodworth combination. But Woodworth's improved cutters, for tongueing and grooving, enable him to dispense with the numerous tools used by Manneville, and made the combination a better one; it enabled him to use cutters mounted on a single axle, instead of using more, as did Manneville; and that improvement in the cutting tools, if new and original in Woodworth, was certainly a patentable invention. And that appears to be the identical invention which he supposed he made, and which he claimed in his patent of 1828, and not the combination set forth in the reissued patent.

16. Answer to the sixteenth cross interrogatory. I do not think the mode of applying the roller in Manneville's patent would wholly prevent the plank from moving laterally, while being tongued and grooved; nor do I think the pressure rollers in the Woodworth machine, when used for tongueing and grooving, would wholly prevent the plank from moving laterally while being tongued and grooved. And hence I suppose the strips *r*, *r*, in the machine, as represented in fig. 7, of the drawings attached to the reissued patent, were put there to prevent such lateral vibration, if they have any use.

17. Answer to the seventeenth cross interrogatory. I believe I comprehend pretty clearly most of the description of Manneville's patent. I do not understand fully the form and structure of his carriage, nor the mode of fastening the plank to it. Nor do I sufficiently understand the mode of construction referred to in that part of said patent in which he states that he has enclosed the entire mechanism in a cylinder of 18 inches, to describe it; if he means more than that he has enclosed the mechanism he has described, which we see represented in the drawings, in a cylinder of that size, with apertures to admit of the passage of the board and the escape of the dust, such I understand to be his meaning, that is, the cutting tools are thus enclosed.

18. Answer to the eighteenth cross interrogatory. In the description in said patent of the mode of planing planks, I understand the fluted pressure and feed rollers are applied to the faces and not to the edges of the plank, and that the edges of the plank move on horizontal rollers. In order to plane, Manneville, in his description referred to, says: "The board is presented edgeways on rollers, whose axles are placed horizontally; two fluted cylinders, placed vertically, and parallel with each other, press the board on both sides. The boxes of one cylinder are stationary, those of the other slide in grooves, in accordance with the variations in thickness of the boards to be planed. The operation of a spring, or weight, upon the back boxes, causes an even and constant pressure to be made by the cylinders upon the board." He describes another pair of cylinders, at the other end of frame, which correspond with the ones just described, except the possession of a device giving them the faculty of self-adaptation to the varying thickness of the board, that not being necessary after it has been reduced to an

equal thickness. Thus the feed and pressure rollers press on the face and not on the edges of the plank, while it is being planed. I do not see the least difference between them and the pressure rollers in the Woodworth machine.

19. Answer to the nineteenth cross interrogatory. I do not sufficiently understand the description, given by Manneville, of the construction of his planes, to attempt minutely to describe them, or represent them by drawings, if I possessed the art of drawing, which I do not. There is no drawing of them in the work above referred to, in which his machine for tongueing and grooving is described.

20. Answer to the twentieth cross interrogatory. I do not find in either of Manneville's patents the combination of rotating planes with pressure rollers for planing planks and reducing them to an equal thickness. There is no drawing of the planing machine described in the said Manneville's patents, in the volume of the "Brevets d'Invention" herein referred to, containing the description of his machine for tongueing and grooving, nor elsewhere to my knowledge. But I find in the first patent of Manneville a combination of rotating cutting tools, and a pressure roller for tongueing and grooving.

21. Answer to the twenty-first cross interrogatory: As I understand it, the patent of addition of Manneville granted on the 28th of April, 1825, does apply solely to the mode of feeding or moving the plank by means of an endless chain of links, or belt of divisions to which the planks are secured by bolts and clamps, and to a modification of the roller for taking the warp out of the planks. The "dogs and bolts," or devices for securing the planks to the improved carriage, do appear to project above the surface of the plank. The roller must be grooved, or have some form of construction, for the purpose of admitting its passage over such projecting bolts. With bolts or clamps projecting above the service of the plank, the cutting edges of the planes would be destroyed by passing over them. Yet, in my judgment, so adapting pressure rollers to the machine as to avoid the use of the projecting bolts, would not affect the principle of the combination of rotating cutting tools with pressure rollers, although the device if new, by which the improvement was made, would be patentable in itself. The roller or rollers of Manneville appear to have been required to pass near the two edges of the plank, near the part to be operated upon, in order to take out the warps. Thus in the machine for tongueing and grooving, there was no necessity for their passing over the whole surface of the board.

22. Answer to the twenty-second cross interrogatory: I think a mechanic skilled in planing machines, could, from Roguin's patents, construct a machine the same in its essential principles, if not in its ostensible form, as Woodworth's, and particularly the machine described in his original patent of 1828. I think, also, it would not require much invention to construct such a machine from the descriptions and representations in the patents of Manneville, certainly not with a previous knowledge of the existence of Roguin's machines. A mechanic hav-

ing no more skill and knowledge of planing than was known in this country, or some parts of it, at the time the French inventions purport to have been made, might not be able to construct such a machine from the French patents. I do not know how much skill mechanics in this country then possessed. In my experience I have known many old things to have been invented over again, for want of knowledge on the part of the inventors of what had been done elsewhere and by other persons. And I have known at least one man who, without any previous knowledge of the science or practice of mechanics, invented a machine very complicated, and I think, very remarkable in its combinations. I allude to the machine for reaping, thrashing, cleaning, and bagging grain, all at one operation. The power to construct machines from descriptions and drawings depends much upon the natural capacities of those who undertake such work, as well as to the degree of knowledge of the peculiar arts to which the machines relate, existing at the time.

23. Answer to the twenty-third cross interrogatory. In the Norcross machine, when the plank is being planed and reduced by the action of the cutters on one of its sides, the other side is held firmly against a rest, to prevent vibration taking place whilst under the action of the knife, and to secure the reduction of the board to an equal thickness. It is also held firmly upon the bench by the weight of that rest and the planing cylinder, and additional weight, if necessary. The rest also performs other functions besides aiding to hold the plank and prevent vibration. It helps to gauge it to an equal thickness, and to curve it concavely so as to compress its fibres. The bench in the Norcross machine does not help to gauge the board to an equal thickness.

25. Answer to the twenty-fourth interrogatory. If the machine as represented in one of its forms in the re-issued Woodworth patent of July 8th, 1845, and now in use, is the one intended in the question, I answer in the affirmative. That bed is solid like the bed or bench B, in the Norcross machine, and has no vertical motion like the rest *f* in the Norcross machine.

25. Answer to the twenty-fifth cross interrogatory. If the Woodworth machine now in use is intended, there are rotary cutters to plane the board, and some mode of keeping the plank in contact with the rest, or bed, (which corresponds to the bench B, not the rest *f*, in the Norcross machine,) to reduce it to an equal thickness; but the pressure rollers, used to keep the board in contact with the bed, and prevent the board from being lifted up towards the centre of the planing cylinder, do not gauge the board to an equal thickness. That is done by making the bed moveable vertically, or the rotating planes. In the Woodworth machines which I have seen in use, the planes are made adjustable, for the purpose referred to. In the Norcross machine there are rotary cutters to plane the board, and some mode of keeping the plank in contact with the rest *f*, and also the bed B. That mode is the weight of the cutters and the rest, and additional weight or pressure, if need be. But if the rest were removed, and the two pressure rollers

used in the Woodworth machine substituted in its place, the board would be kept down to the solid bed B, as it would be kept down to the solid bed in the Woodworth machine, but it would not be gauged and planed to an equal thickness. The rest *f* being so constructed as to be made to recede from and approach to the cutters, gauges the board to an equal thickness, like the solid bed, and the cutters adjusted, for the same effect in the Woodworth machine.

26. Answer to the twenty sixth cross interrogatory. In each of the machine, last spoken of, the board is reduced by the rotary cutters to an equal thickness at the same time it is planed, as was the case in the machine of Roguin, and by the reciprocating cutters in the machine of Manneville.

27. Answer to the twenty-seventh cross interrogatory. For a full and detailed answer to this interrogatory, I refer to my answer to the sixth interrogatory in chief.

28. Answer to the twenty-eighth cross interrogatory. If by "results" is intended the planing of boards, both produce the same results. But if the manner and perfection of execution are intended, *than* the Norcross machine does produce results which the Woodworth machine cannot *not* produce. And those results, in my judgment, imply the addition of a new principle, or element, to the combination of mechanism, constituting the planing machine. That new principle, or element, is in a device not to be found in the Woodworth machine, ancient or modern. In my answer to the sixth direct interrogatory, I have explained fully the differences in the result, and the mode of producing them, to which I refer as a further answer to this interrogatory.

29. Answer to the twenty-ninth cross interrogatory. I refer for my answer to this interrogatory to my answer to the sixth interrogatory in chief, where the matter implied by the present question will be found fully set forth.

30. Answer to the thirtieth cross interrogatory. There are devices or means in the Norcross machine by which the board is fed to the cutter; by which a rest is made to bear down upon the unplaned surface of the board, causing the surface to be planed to curve, and thus to compress its fibres, thus preventing it from being splintered, or from having its knots torn out, if it has any; also, to prevent the board from being drawn towards the axis of the cutters by the operation of planing; and that is done not by pressure rollers, or the pressure of the cutters and rest, but by that of the solid and immoveable bench, near to the edges of the cutters, as they make their downward stroke; also, of planing and reducing to an equal thickness by the same operation, and that is done not by a device adjusting the relative distance of the planing cylinder to the solid bed, as in the modern Woodworth machine, but by a device to adjust the moveable rest *f* to any given distance from the planing cylinder, or the reverse; nor was it done on a carriage, as in the original Woodworth machine; also, of so arranging the machine to admit boards of varying thickness to be feed to the cutters by feed rollers, as in the Woodworth machine, and the machine of Manneville, and the machine of Hill, but not by precisely the same device by which the same

thing was done in the machines of Roguin; also, of adjusting the periphery of the cutter to a moveable rest, (not an immoveable bed, as in the Woodworth machine, as now used,) on the opposite side of the plank or board, to determine the exact thickness to be left after being planed; also, it has a pair of feed rollers, one of which rises and falls vertically, and is held down by a weight, to accommodate the varying thickness of the plank, as it passes towards the cutters, whilst the cutting cylinder, and the rest opposite to it, remain at the same distance apart, but it has not a corresponding pair of rollers on the other side of the cylinder, as in the Woodworth machine; also, it has, as I have already said, this varying distance between the upper one of this pair of feed rollers, which I am describing, self-adapting by pressure, to keep the face of the plank not against the rest *f*, but against the under or parallel roller, in order to grasp the board between them and move it along. The device in the Norcross machine, for holding the plank down upon the solid and immoveable bed B, is the weight of the planing cylinder and the peculiarly shaped rest *f*, and not pressure rollers on each side of the planing cylinder.

31. To the thirty-first cross interrogatory. The same answer is given as to the thirtieth.

32. Answer to the thirty-second cross interroatory. I understand by the "principle of a machine," the peculiar manner in which its parts are made to operate conjointly to produce a given result. Sometimes the "principle" of some of the devices in a machine, and the mode of operation of those devices, may be different in one machine from the "principle" and mode of operation of certain devices in another machine, and yet the principle of the two machines may be the same. By "analogous devices," or "mechanical equivalents," I mean device in mechanism different in form and mode of operation, but producing the same results, or rather performing the same offices. Thus, a carriage holding a board in a planing machine, may be moved by rack and pinion, or by rollers, or by a rope passing over a pulley upon a windlass; these would be mechanical equivalents, although different in form and structure and mode of operation, and would perform the same office. Therefore, either of them might be introduced into a combination of mechanism to perform the precise office which either could perform, without changing in the least the principle of that combination. And, if a new device could be invented for performing precisely the same office by itself, or in combination with other devices, which other well known devices perform by themselves, or in combination with other devices, it would itself be patentable, but it would be the mechanical equivalent for the other and well known devices. And in such a case the new device could not be used by others, by itself, or in combination with other devices, although the other parts of the combination, if old, might be used in connexion with old devices performing the same functions of the new device, whether or not they performed that same function not so well as the new device, or even better, as I have sometimes known in the history of invention. All

invention is not improvement. But if a device were invented, performing the same office which other well known mechanical devices perform, and other functions besides, it would be more than the mechanical equivalent of the previously known device whose office it might perform, and, if combined with the same mechanism, would introduce a new principle or element in it, and make it patentable as a new combination. Thus, the device for gauging a plank to an equal thickness, by making the cutters and the bench or rest approach to or recede from each other, would be the equivalent for a device for gauging it upon a carriage, although different in form and mode of operation. And if it were new it would be, in itself, patentable, and would be patented by itself, or in combination with other devices; but it would not prevent other people from using the old devices in the same combination. And, substituting it for the mode of gauging the thickness of a plank on a carriage, in a combination with a rotating cutter, would not alter the principle of that combination, or make it a new combination. To illustrate my meaning more clearly, I will take the case of the Woodworth planing machine. The reissued patent for that machine claims combinations only, not single original inventions or improvements; it thus admits that every mechanical device in it, considered by itself, is old, and may be used by any body. Thus, in the first place, it claims the employment of the rotary cutter in combination with pressure rollers to keep the plank from being lifted towards the centre of the cutter cylinder; 2d, it claims the rotating planes in combination with the cutter wheels for tongueing and grooving; 3d, the combination of the tongueing and grooving wheels; and, 4th, the combination of either the tongueing and grooving cutter wheel, with pressure rollers. Now, there is not, in any one of these four claims, one which covers either the rotary cutters, the pressure rollers, or the tongueing and grooving cutter wheels, which constitute the elements of all the combinations claimed in the patent. I say there is not one of these devices, considered by itself, claimed separately as an original invention or an improvement. In fact, there is not a single mechanical device in the whole Woodworth machine which is claimed in the reissued patent as an original invention or an improvement of old Mr. Woodworth; neither the stationary bed, nor the mode of gauging the plank to an equal thickness, nor the mode of feeding the plank to the cutters, is claimed as new, nor are the pressure rollers. All, therefore, are the common property of the public, and any body may use them separately or in any new combination.

Now, with regard to the combinations themselves. The patent covers only certain clearly defined combinations. It must be confined to those precise combinations, or to combinations of mechanism, each in itself, and all as a combined whole, performing the like functions. If a new device or element is added, producing new effects, or modifying the old effects, it makes it a new combination not infringing Woodworth's, although it may interfere with and supersede it, as is the case with all real improvement in the arts, it being an object of in-

vention to do away with old things by improved, or new, and better ones. And such is the case in the Norcross machine. He introduces new devices, or modified combinations, not before known or used, and not in the Woodworth machine, which enables his machine to do better work than that of Woodworth. Thus, he has added to the elements which constitute the combination of mechanism, called the planing machine.

Now, to test the Woodworth machine as now used, by the French patents heretofore described, according to the principles above laid down, we find in Roguin's first machine a carriage for holding and gauging the thickness of the board, a strip across the frame, close under which the upper edges of the carriage frame move along, thus holding it down, and performing the office of a pressure roller, the ends of the axle on which the cutters revolve seeming to aid in performing the same office; and we find also rotary cutters for planing, tongueing, and grooving, all at one operation. Thus, we have in this machine, all the elements of the combinations claimed by Woodworth. Now, if he had improved the planing cutters, or the tongueing and grooving cutters, as he supposed he had in his original patent, that would have properly been the subject of a patent, but it could not have prevented other people from using the old, or even new cutters which they might have invented, in the same combination, or any other combination substantially like it. And if Woodworth had invented the pressure rollers, (which is not pretended) and substituted them for the means used in Roguin's combination to confine and keep the board in its place, he could have been protected by a patent in their use, but any body else could have used the combination with other devices for pressing down or confining the board. It would not have been an improvement in the principles of the combination, but only in one of its details. It would have been merely introducing a new device to perform precisely the same office which was performed by other mechanical devices. And the same remark may be said in reference to Roguin's improved machine. In that there was a combination of a rotating planing wheel with methods for gauging the thickness of the board, confining it to its place, and keeping the cutters down near enough to the board to enable them to perform effectually their office of planing and reducing it. In this machine the board was stationary, and the cutters traversed it longitudinally. This change of relative motion did not, however, change the principle of the combination, and is a striking case in point, to show how machines may differ in form and mode of operation, and yet involve precisely the same principles. In Manneville's planing machine, as described, we find precisely the same device for feeding the board to the planing cutters, and confining and holding it firmly for the operation of being planed, to wit, friction and pressure rollers, which are fixed in the Woodworth machine. But the cutters in Manneville's machine are not the same. They are planes having a backward and forward motion. Now the invention and substitution of rotary cutters for the reciprocating planes might be an im-

provement. The mere taking the rotating planes from Roguin's machine and putting them into Manneville's, certainly could not require much invention, and that would be substantially making the same combination covered by Woodworth's first claim, to wit, the employment of rotating planes in combination with pressure rollers. It would not require near so much invention as the combination of the rotating planes and rest, so as to have a vertical motion together, and the invention of the peculiar form of the rest and the adjustment of its position over a portion of the bench, producing the improved mode of operation in the Norcross machine.

Thus, from the above explanations, it will be seen that the mere substitution of one "analogous device," or "mechanical equivalent," for another analagous device or mechanical equivalent, the former performing precisely the same functions of the latter, would be no change in the principle of the machine. But substituting a new mechanical device or combination, performing the same function of an old one, and performing additional functions of the same kind, would be a change in the principles of the machine, or combination of mechanism into which it might be introduced.

I will add that the combination of the rotating planes and pressure rollers in the re-issued patent of Woodworth, really covers no mechanical device or combination, which could, independently of itself, accomplish a useful practical result. That combination would be good for nothing for planing boards without the solid bench, and the device by which the board is gauged to an equal thickness. Those essential devices in the Woodworth machine are left out of the combination, and are not covered by the first, nor by any of the claims in the patent.

33. Answer to the thirty-third cross interrogatory. As I have already remarked in one or two of my previous answers, I do not call myself an expert, unless the facts and circumstances touching my means of acquiring an expert knowledge of mechanics, detailed in my answer to the first chief interrogatory, make me such. I there say, that I was over four years commissioner of patents of the United States, in which office I was required, more or less, every week to examine machines and inventions, with a view to their originality and novelty. I found, while in that office, that its duties, so far as they related to the examination of machines and inventions, often called into exercise my highest powers of analysis and comparison, even more than the practice of that branch of the law called special pleading. While in that office I saw numerous models and drawings of almost every variety of machines, and had them explained to me both by the inventors and the examiners, not one of the latter of whom, by the way, was a practical mechanic. As to my knowledge of the science of mechanics, I do not pretend to very much. When I was a student at law I read the treatise on mechanics, published in the Library of Useful Knowledge, as I did most of the other treatises on scientific subjects, published in that series of publications. Since then I have read other treatises of Kaller, and Lecouer, and Manley's, for instance, in

whole, or in part, on mechanics. And I have also read treatises on the steam engine, and on other scientific subjects, more with a view, however, to acquire general information that might be useful to me as a man, and a member of an honorable profession, than to fit me for any particular duty or avocation in life. I have read works on Animal Mechanics, Physiology, and Surgery, more or less, and I have examined and referred to many Dictionaries, and some Encyclopedias pertaining to science, embracing that of mechanics. Such have been my means of acquiring a knowledge of mechanics and machines. The time I have spent in acquiring what little knowledge I possess of these subjects, I cannot tell. I never was a practical mechanic, and, therefore, have followed no branch of mechanics as an occupation. I have testified as an "expert," (if my means of knowledge of machines and inventions make me one,) by affidavit or deposition, once at the request of Henry A. Burden, of Troy, N. Y., in a controversy relating to his machine for reducing puddler's balls; three times in relation to planing machines; once in relation to the magnetic telegraph; twice in relation to the machine of Thomas Blanchard for turning irregular forms; and once, I believe, in relation to a system of measuring for cutting garments, for the use of tailors.

34. Answer to the thirty-fourth cross interrogatory. I do not remember that I ever examined any machine which I regarded as an infringement of the Woodworth patent. Yet, while I was commissioner of patents, such machines may have been examined by the examining clerks in that office, and rejected in my name, it being the duty of that officer to sign all official letters and decisions of that office, although he, in fact, may not have made the examination of the machine rejected, nor have known any of the particulars of the case unless specially brought to to his attention by the examiner for advice, or by the party claiming a patent appealing from the decision of the examiner to the commissioner.

35. Answer to the thirty-fifth cross interrogatory. If that part of the Woodworth machine covered by the reissued patent is intended, the principle embodied in the machine, is planing a board by rotary cutters, the board being held from working up towards the centre of the cutting cylinder in the machine—the planing, tongueing, and grooving at one operation—the tongueing and grooving at one operation—the keeping ing the board steady by pressure rollers while either the tongueing or grooving operation is being performed. If the whole machine is intended, much more is embraced, viz., the gauging of a board to an equal thickness, and the feeding the board to the cutters. Also, there are modes of communicating the motive power to the various parts which may be embraced in the scope of the question. But, I suppose it is intended to confine the application to the particular parts of the machine covered by the claims in the patent. If the whole machine is intended, the principle of the machine is the manner in which the action of all its parts concur to produce the desired result, viz., planing boards, etc.

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36. Answer to the thirty-sixth cross interrogatory. The "mode of operation" of the Woodworth machine, as described in the reissued Woodworth patent and now in use, is the feeding the board to the cutters, through feeding rollers; planing it with rotating planes, as it passes over a solid bench, the planes being so adjusted to the bench as to gauge the board to an equal thickness; confining it while being planed from being lifted up into the cutter wheel and thus damaged; and tongueing and grooving it at the same time, if need be. In being planed, the board passes over a bench as before stated, a little oval in its form, which, with the action of the pressure rollers, causes it to be curved upwards, thus loosening its fibres and knots, making it more liable to be splintered and to have its knots torn out, and also making little ridges (caused by the cutters cutting upon the top of the curve) across the board from one end to the other. It therefore does not reduce the surface of the board to an absolute plane. Such is the mode in which I understand the machine to operate. And thus operating, it would not work well on timber that is thin, shakey, and knotty. To give a condensed definition of the "mode of operation" of the Woodworth machine, it is the combined action of its various parts to produce the result desired. And again, the principles of the machine may be essentially the same, and the mode of operation of their various parts be different, as in the two machines of Roguin's, which I have already described. In one the rotary planes were stationary, and the board traversed by them; in the other, the board was stationary, and the planes traversed over its surface.

37. Answer to the thirty-seventh cross interrogatory. My answer must depend much upon how the word "inventing" is understood. If it means the power of creating a machine, which had never been before known, using the simple mechanical powers in its invention in new and unknown forms and combinations, it might embody a totally different principle and mode of operation from any now in existence, and yet produce the same results. The manner in which the various parts, of which it were composed, might operate, or, in the language of the interrogatory, its "mode of operation," might be different from the manner in which the various parts of an old machine operates, and yet the result produced, for instance, planing boards, the same. The result produced by a machine, new in all its parts, and having a different "mode of operation," might be better than the result produced by an old machine, or it might not be so good. All invention I do not think is improvement, yet the thing invented may be original, novel, and patentable. Again, "invention" might consist in producing a mechanical device never before known to perform the same function in a combination of mechanical devices which an old device performs, in which case the "mode of operation" (applying the phrase generally to the machine) would not be changed. The "mode of operation" of that particular new device might be different from that of the old device which it superseded; but the "mode of operation" of the machine, as a whole, would be the same. Again, a new arrangement of the same

parts of a machine may make its "mode of operation" much better, but it could hardly be deemed invention. Thus "inventing" a machine may constitute an entire change of principle in the machine, or to speak more precisely, it may make a machine, operating on a new principle; and such, I think, would must likely result from the "inventing of a machine," which, I suppose, means a whole machine. But inventing a single device to supply the place of another device, performing the same office, would not change the "principle" of a machine. Thus the meaning of "invention" and "mode of operation" depends very much upon how they are applied, as is the case with words and phrases generally. If the question were in a more intelligible form, I might be able to give it a more precise and lucid answer.

If the yielding bars or plates were properly constructed, and applied in the same places, and for the same purposes, and producing the same effects, their substitution for the pressure rollers would not, in my opinion, essentially change the principle or mode of operation of the Woodworth machine. But if they were constructed in a different manner from the pressure rollers, so as not to produce the same effects, were applied in combination with other devices to different parts of the machine, and by their own action, and in their connexions with other parts of the machine, caused it to operate in a different manner, producing the result of planing boards in a different or modified way, and more perfectly, then I should think these substitutes for pressure rollers would essentially change or modify both the "principle" and the "mode of operation" of the Woodworth machine.

38. Answer to the thirty-eighth cross interrogatory. I do not think it would constitute an entire change in the principle or mode of operation of the Woodworth machine, to connect the bed and rotating planes in a separate frame, and have the pressure rollers stationary, and instead of pressing the plank against the bed, press the bed up against the plank, the bed and rest always retaining the same relative positions. It would, in the arrangement supposed, still curve the surface of the board to be planed upwards or convexly. Thus loosening its fibres, and exposing it to greater damage by the tearing out of splinters and knots. Besides, the planes would cut on the apex or top of the curve, leaving transverse ridges from one end of the board to the other, just as the machine has a tendency to do, when constructed with the bed stationary and immoveable, and the pressure rollers yielding.

39. Answer to the thirty-ninth cross interrogatory. I must answer this interrogatory by supposing cases for the better illustration of my meaning. Suppose, for instance, the pressure rollers in the Woodworth machine were made stationary, and the rotating planing cylinder was under the surface of the board to be planed, and the bed or bench hung over the board, (the planes and the bed preserving their relative distance from each other,) and were made to press downwards upon the board, thus arranged the board would still be curved convexly towards the planing cylinder, the latter would plane upon the

apex of the curve, and the same difficulties, or rather imperfect work would result, which would result from the operation of the machine as now arranged. Suppose, instead of being made a little rounding, as it now is, the bed should be but a straight bar, it would produce the same curve in the board, and offer a less firm resistance to the action of the planes. Suppose the bench or bed in that position should be concave on the under side, or that next to the upper surface of the board, it would still curve the under surface towards the planes, and offer a still less firm resistance to their action. Besides, if the planes and the bed were hung in a moveable frame pressing downwards upon the board, it would be liable to press too much upon the board. Thus the pressure would be more difficult to regulate and control. In short, the arrangement would not be so good as it now is. And yet the arrangement I have supposed embodies all the essential devices combined in the Woodworth machine as now used.

I will now take the Norcross machine. In the first place, he has a solid bed, over which the board passes, divided into two parts. Between these two divisions, very near the anterior one, or that over which the board first advances, the rotating planes are hung, so that the cutting edges of the planes in their revolution approach very near to the edge of its upper surface. The planing cylinder is, also, so hung as to cause the edges of the planes to pass, in their revolution, a little above the plane of the bed over which the board passes. Thus arranged they would cut down upon the edge of the solid bed or bench, which would offer a much firmer resistance to their action than a pressure roller, necessarily situated at a greater distance from the planes; thus not pressing upon the surface of the board near to the edges of the knives, and thus exposing it more to be torn up and splintered, and which, from their very nature, must be more or less yielding, certainly not so firm in their resistance to the cut or stroke of the planes, as a solid and immoveable bed. Now, suppose a board to be fed or advanced over the bed and the cylinder, the latter, if fixed, like the Woodworth cylinder, would plane the board but very imperfectly; certainly the bed would prevent it from being drawn in towards the centre of the planing cylinder. Now, suppose the pressure rollers were applied on each side of the cylinder, as in the Woodworth machine, over the board to press it down upon the bed. Here we should have the solid bed, the rotating planes, and the pressure rollers of the Woodworth machine; and yet, these pressure rollers would do nothing to prevent the board from being drawn in towards the centre of the planing cylinder by the action of the planes, that office being performed mainly by the anterior portion of the bed. Yet, the board could not be gauged to an equal, nor curved concavely towards the planes. Now, suppose we make an addition to the devices of the Woodworth machine, and add a bar above the planing cylinder, so adjustable in its distance from the cylinder as to gauge the thickness of board to be planed, but not wide enough to project over any portion of the bed. Suppose the bar to be plain upon its surface, or oval, like the Woodworth bed, still something more would be wanting. This bar and the cylinder being fixed, and having no upward and down-

ward motion, they could not adapt themselves to the varying thickness of the board, although the pressure rollers, which I have supposed already in the combination, could; and thus, if the board were, in any portion of it, too thick to pass through the space between the upper surface of the bed and the under surface of the bar, it would be stopped, and could not advance at all. Besides, although we should have the bench or bed, the pressure rollers, the rotating cutters, and the bar above the cutters to gauge the thickness of the board, yet the board could not be deflected so as to describe a curve, the under or concave side of which would be presented to the edges of the planes, in the segment of a circle, approximating to the periphery of the circle, described by the revolution of the planes, thus compressing and holding fast the fibres and knots of the board while being planed, and thus permitting the planes to cut, not in a series of little concaves, leaving corresponding ridges, but in a line parallel with the unplaned surface of the board. Now, suppose we put the planing cylinder, and the bar above it, by which the thickness of the board is gauged, into a frame, and let them pass down by their conjoint weights, or by superadded weights, or pressure, upon the board; thus arranged, they might accommodate themselves to the varying thickness of the board, but they would tend to deflect the board convexly towards the circle of revolution of the planes, and thereby produce the defects in execution which the Woodworth machine produces. Now suppose, instead of this bar, the concave rest *f*, in the Norcross machine, is added, and the pressure rollers taken away, the rest being so adjusted, in respect to the anterior part of the bench B, as to project a little over its edge, next to the planing cylinder. This would produce a new effect, and the one aimed at in the Norcross machine, which the Woodworth machine does not and cannot produce. In operation, the rest would bear with the weight of the cylinder, or additional weight, if necessary, really upon the edge of the anterior portion of the bench; in other words, it would bear upon the board, interposed between it and the bench. Therefore, it could never deflect the board downwards, causing its under surface, which is to be planed, to be convex, when it is presented to the edges of the planes, thus loosening its fibres instead of compressing them, and causing the other defects in execution, as in the Woodworth machine. But being concave, and one edge of its concave surface resting upon the edge of the bench B, or rollers, the board interposed between it and the bench, it would cause the board to deflect downwards, or concavely, thus compressing the fibres, and producing the new and beneficial effects which I have many times before described, and which the Woodworth machine cannot produce. The rest in the Norcross machine aids in performing three different functions, viz.: it helps to gauge the thickness of the board, to curve it downwards, and compress its fibres, and to hold it fast while undergoing the action of the planes. The four rollers in the Woodworth machine do not perform these functions. In these illustrations will be seen the differences between the Woodworth and the Norcross machines.

40. Answer to the fortieth cross interrogatory. I am not engaged as

counsel or attorney for the defendants, or either of them, in the present cause, nor in any suit, nor for any party using or owning any planing machine or machines, and having no such engagement as the question implies. My compensation is not contingent upon the success of such party, nor upon the defeat of the Woodworth patent.

41. Answer to the forty-first cross interrogatory. If "attorney, counsel, or adviser" are intended merely to define professional relations with Nicholas G. Norcross, the following is all I have had to do with him, in my professional occupation, as attorney and counsellor at law. Some time in January last, Mr. Norcross wrote to me at my residence, in Newport, N. H., desiring me to attend for him, at Montpelier, Vermont, and oppose an application for an injunction against one of his machines, at Brattleboro', Vermont; the hearing of which, I think, was to take place on the 12th day of that month, or thereabouts. I prepared to go, and did go as far as Concord, N. H., on my way to Montpelier. There he addressed to me a despatch, by telegraph, informing me that the hearing of his case, at Montpelier, had been put off, and desiring that I would come to Lowell, where he resides, and see him; I went to Lowell, spent about half a day there, saw Mr. Norcross, and talked with him about his machine, and his controversy in Vermont, and was shown his and his partner's establishment for manufacturing lumber. I was also shown one of his machines in operation. He desired me to go to Brattleboro' and see his counsel there, and make some arrangements for his defence, against the application for an injunction against his machine, or, rather, the men who were using it. I went to Brattleboro', and was absent five days, Sunday included; the expenses of my journey amounted to a little more than $16; on getting home I wrote to Mr. Norcross, informing him of the amount of my expenses, and that if he would send me $50, it should settle for both my time and expenses. He has not yet paid it to me, and thus I have never received one cent as his "attorney, counsel, or adviser." He wished to engage me as his counsel and attorney, to look up and prepare testimony for him in his controversy with the owners of the Woodworth patent, but I declined. He has never retained me in a single cause of his, unless requesting me to go to Vermont for him, as above stated, can be considered as such, and I do not now consider myself engaged in the Vermont cause. Indeed, I do not know its present condition, if still pending; nor its fate, if it has been decided. I am not, therefore, now his counsel, attorney, adviser, or agent of any kind, in a professional sense, in any controversy, pending or prospective, growing out of the Norcross machine and the Woodworth patent. Nor am I to have any compensation, contingent or otherwise, for such service, except the amount I require of him to reimburse me for my time and expenses in going to Vermont, which I consider low enough for the time I expended. For the time I have expended in giving this deposition I expect to be paid, and I expect it without respect to the fate of the case in which it is to be used. Mr. Norcross never offered me a contingent compensation or fee of any kind.

In connexion with this matter, respect for myself impels me to re-

mark that no person would put such a question, of the character of the two last above, to another, holding a respectable position in society, which can be attained only by a life of truthfulness and integrity of conduct, who would not himself be suborned, or who would not suborn others to commit perjury, by an inducement in the shape of a compensation, "contingent" upon the success of the villany.

The words written on the margins of the preceding sheets, and marked with asterisks, thus (*) are intended to be inserted in the body of the deposition, where the corresponding marks are to be found.

EDMUND BURKE.

Subscribed and sworn to before me,

B. B. HALLETT,
Com'r circuit court U. S., for Mass. district.

Exhibit C.

Referred to in answer to the 3d interrogatory in chief, on page 21, and annexed by me.

B. F. HALLETT, *Com'r.*

[2079.]

March 15, 1817.—Patent of invention for fifteen years, for a machine proper to plane lumber of every description and any dimensions, and for the purpose of making on this substance grooves, tongues, and mouldings.

To M. Roguin, (Louis Victor Joseph Marc,) at Paris.

The object of this invention is to reduce much manual labor in preparing lumber taken in the state of planks and boards, in order to extend the uses of this substance.

The working up of lumber, whatever may be the use for which it is intended, may be reduced to four principal operations, which are:

1st. Planing.

2d. Making grooves and tongues for jointing.

3d. Making mouldings, used as ornaments.

4th Making tenons and mortices to assemble the pieces of work.

This last operation is not susceptible of being performed by machinery, because the place for the tenons and mortices depends on the length of the frame work, and because this length itself is likewise submitted to the dimensions of the entire work; but the first three operations can be performed and are really executed by the machine.

Description of this machine, plate 27th, fig. 1st, side elevation.

Figure 2d.—Plan.

This machine is formed by a bench composed of two parts, the one, *a*, is stationary, the other, *b*, is moveable, and is called the carriage; this carriage, borne upon six small wheels, and of which fig. 3 gives particularly a side view, rolls over a projecting part, *c*, called cornice; it is provided with a moveable floor which, by means of elevating screws,

placed from above downward in the thickness of the wood forming the frame of the carriage, is raised or lowered as required by the lesser or greater thickness of the board submitted to the action of the machine.

This carriage is drawn by a roller, *d*, the axle of which carries at its extremity a toothed wheel, *e*, in which catches a pinion, *f*, the axle of which is provided with a crank, *g*.

Upon the permanent part of the bench, is placed horizontally an iron shaft, *h*, represented particularly by figure 4th. The journals of it revolve in brass boxes lodged in iron supports, *i*; this same shaft carries a pinion into which catches a large wheel, *l*, acted upon by a crank, *m*; it carries also the planes which are cylindrical, and whose diameter and thickness are regulated by the effects to be obtained. The blades with which these cylinders are supplied are caught in the thickness of the iron; they are cut obliquely. In the middle of the cylinder is a square hole, through which goes the shaft; the tools are fixed upon this shaft by means of pins.

N. Plane merely intended for planing.

O. Plough plane, for making a groove.

P. Combination of two plough planes, leaving between them the thickness of a tongue.

Q. Combination of three planes forming a moulding, presenting an ogee between two squares.

R. Fig. 2d, a board laid flat upon the carriage, the plane, *q*, is cutting a moulding on the edge of it.

S. A board set edgeways upon the carriage, plane *o* cuts a groove in its edge.

T. A board also set edgeways upon the carriage, plane *p* cuts out a tongue on its edge.

U. Ropes by means of which the roller drives the carriage.

V. A wooden frame fastened to the bench, and bearing the axle of wheel *l*, and one of the extremities of shaft *h*.

X. A wooden cross piece called the guide *y*, a small bracket supporting pinion *f*.

Action of this machine.

If the carriage drawn by the roller progresses at the rate of five millimeters per second, the plane mounted upon shaft *h*, set in motion by wheel *l*, performs, during the same length of time, ten revolutions on itself, (as one is to ten, so are the teeth of pinion *k*, to those of wheel *l*;) hence, this plane being armed with eighteen blades, there results from the combined motions of the tool and of the lumber submitted to its operation, that one hundred and eighty blades operate in succession upon the length of five millimeters of lumber, which, on account of the slow, regular, and progressive motion of the carriage, offers one after another a fresh surface of lumber to be removed.

In the experimental machine, of which we have just now given the explanation, the motion is obtained by hand power, and what is gained

in power is lost in time; but with a machine built on a large scale it would be different. The motive power will be a horse power or a steam engine; then the tools, susceptible of being of a larger diameter, may have more blades, and being able to regulate the power, we shall be able, by increasing the velocity of the tools, to increase in a like proportion the progressive motion of the carriage.

The return of the carriage, accomplished by a mechanical means, made use of to change continual rotary motion into an alternate rectilinear motion, would cause a great loss of time, since the time consumed in the return of the carriage should be equal to that required for its progress. I intend to make good use of this return action, in running a machine on a large scale, and to lose, by means of a suspension of motion, only the time necessary to turn over or change the lumber.

To this effect, a second shaft shall be placed back of the first, carrying at its extremity, a wheel of the same dimensions as the pinion of the first shaft, which wheel, catching into this pinion, will turn and cause the second shaft to turn in a direction opposite to the first shaft; in order that the tools of the second shaft may not stop the board in its first motion onward, this second shaft will be supported by bearers with hinges, so as to be raised or lowered at will.

By this very simple means, both the forward and the backward motion of the carriage are made use of, and there is as I have already mentioned, only lost, the time required to turn over or change the piece of lumber.

Patent of improvement and addition, March 30th, 1818, delivered to M. Roguin, (Louis Antoine Gabriel,) assignee of M. Roguin, (Louis Victor Joseph Marc.)

Description of a machine of the same kind as the preceding one, but built on a larger scale.

Plate 28th, figure 5th. Lateral elevation of this machine.

Figure 6th. Plan.

In the preceding machine the tool is permanently fixed, and the lumber moves forward under that tool; in the new machine, on the contrary, the tool has two motions, the one rotary, the other progressive.

In the first machine, the tool was an iron cylinder, in the thickness of which the blades were caught; in the tool of the new machine, which is seen in profile, figure 7th, we have substituted in the place of the iron cylinder of the former machine, a cast iron socket, upon which moveable plades, used to plane and groove, and which are seen in detailed figures *b*, *c*, are set in a clamp whose inferior position is fixed and belongs to the socket; the upper position, (see details,) is moveable; the blades are held between the two jaws by the pressure screws *e*, which are seen, figure 7th, upon the moveable portion of the clamp.

Upon the interior portion of this clamp are fixed small steel blades, working in the same manner as the second iron of a double ironed plane.

This tool is borne by a carriage *f*, fig. 6th, made of cast iron, to the posterior extremity of which is fixed an iron axle *g*, bearing two brass pinions *h*, which bite into a rack *i*, and regulate the motion of the carriage.

The table *k*, is moved vertically by means of the screws which are seen, *l*, in fig. 8th, representing a transversal section made according to the dotted line A, B, fig. 6th; these screws support, elevate, or lower the table or floor as required by the thickness of the lumber submitted to the operation of the machine. Four small, graduated, metallic plates are inserted into the internal angles of the frame work, and are used as regulators to place this table in a perfectly horizontal position; *m*, two iron squares steadying the table at both extremities, and preventing its vibrations when the machine is at work.

The carriage, the elevation of which is represented by fig. 9th, is made of cast iron, and weighs, including the tool which it carries, about one hundred and ten kilogrammes; it is requisite that this carriage should be sufficiently heavy not to be lifted up by the effort made by the tool upon the wood, an effort, however, much less considerable in this, than in the former machine, since in it the tool was perpendicular with the axis, while the bevel of the new tool is almost tangent to the circumference.

N. A pulley receiving the motion from the motive power, it drives the large pulley *o*, upon which it is fastened; the latter communicate motion to the tool by means of the pulley *p*, with two grooves, corresponding with the return pulley *q*.

R. Axle of the pulleys *n*, *o*, bearing at one of its extremities, a brass pinion, *s*, catching into a wheel *l*, bearing in its centre a pulley, which, by means of a rope and another pulley, *u*, fastened upon the end of the shaft *g*, impels the carriage; the rope which goes over the pullies comes back over a return pulley *v*.

The posterior part of the table *k*, is supplied with a claw *x*, against which the lumber strikes and stops, in the same manner as upon carpenter's benches; the same piece of lumber is screwed at the other extremity by moveable clamps *y*, passing under a bridle *a*, which is crossed through by pressure screws.

Fig. 12th, exhibits the elevation of one of the racks *i*, adjusted upon the frame *c*, of the machine, and into which catches one of the two pinions *h*.

The carriage is promptly brought back to its starting point, by means of a rotchet wheel, with a catch, having the same centre as the toothed wheel *l*, figures 5th and 6th.

The guide represented in the first machine by letter *x*, is in the new machine borne by the carriage.

The letters *e* and *f*, in the detailed figures, represent a tongueing and a moulding iron.

1185.

[4241.]

March 9, 1825.—Patent of Invention for fifteen years, to M. De Mannevillie, (Leonore Thomas,) at St. Quenton, for two machines, for the purpose of grooving, planing, and reducing to an even thickness, boards intended for flooring, as well as all sorts of boards, whatever may be their dimension.

By means of the grooving machine, figs. 1st to 4th, plate 12th, the two joints, the tongue and the groove, are made at the same time.

The side of the tongue is made by means of five circular saws, three of which, *a*, *b*, *c*, are each mounted upon a horizontal axle, and the other two, *d*, *e*, revolve horizontally upon one single axle, placed vertically.

The office of saw *a*, fig. 1st, is to joint the tongue *o*, only; that of saw *b*, is to make the lower slit to the depth of the tongue *o* only; that of saw *c*, is to make the upper slit to the depth of the tongue *o*, only. The use of saws *d* and *e*, is to separate the tongue, *o*, from the wood which is attached to it, above and below, by cutting horizontally the board, until they reach the cuts made by saws *b* and *c*, which precede.

The office of the fork *f*, is, by one operation, both to displace the two small slats, *k*, *c*, which, by the above described operations, have been detached from above and below the tongue, and take off the two sharp corners of the aforesaid tongue, in order to facilitate the introduction of the latter in the groove *m*, which has just been formed at the same time, and which I am going to describe.

It may be noticed that by this process there is, in a measure, no loss or waste of material, and that the two sides of the tongue which joiners, by means of ordinary tools, bring down, at the expense of much labor and time, in chips of inconsiderate value, form by the new process so many small rulers or slats, which may be advantageously made use of in various ways.

Fig. 2d, shows the operation of grooving *m*; saw *g*, mounted upon the axle of the parallel saw *a*, performs as the latter, the office of jointing; and both saws, *h* and *j*, revolving together horizontally upon a vertical axle, slit the wood in a parallel manner, precisely to the depth intended for the groove *m*, calculated to receive a tongue similar to the one above described.

Then this groove is scooped out by a plough plane, armed with several irons, one above the other, and biting gradually; this plough receives, from the common motion, a rapid backward and forward motion.

To one of these irons is attached a small tool, in the shape of a saw file, for the purpose of taking off the sharp corner of the two sides of the grooves.

For the same end, I likewise sometimes use a tool carrier, mounted upon a vertical axle. This tool carrier is armed with several irons, resembling much those of plough planes, with the exception, that they present themselves alternately in an opposite direction, and obliquely to meet the wood, which they cut out neatly.

The board to be grooved is previously well fastened upon a carriage, progressing between conductors, allowing of no deviations in any direction, and bringing the parts in opposition, according to the will of the operator.

In order to prevent the board from presenting to the tools any bend or warp, I make use of a bearer, whose weight rests by means of a roller on the board at the place where it is going to be operated upon; the weight of the bearer may be increased or diminished, by a motion of the foot, or any other in causing the weight to slide to the right or left, according to the want.

This bearer resembles much an old-fashioned steelyard, on which the same weight, by means of a forward or backward motion, is made to ascertain the weight of any object; with this difference, however, that the support of the steelyard is placed between the weight and the object to be weighed; whilst here, the lever is fixed back, and the roller forms the bearing point.

Any other system of leverage may equally be used; I have myself made use of another on one of my tables, in which I have enclosed the whole mechanism in a cylinder, eighteen inches in diameter only.

By means of two openings about two inches high, on each side of the cylinder, the board enters in the rough state, and comes out perfect from the cylinder, into which are concentrated all the performing tools, unseen by any one; an opening is practised beneath, to allow the escape of the dust of the circular saws.

By the same machine, we obtain on the end of boards, the same operation as just now described for the edges, no matter what bevel may be wanted; the whole secret consists for this purpose in the direction to be given to the carriage, which bears the wood to meet the tools.

I believe it to be useless to describe minutely the frame work upon which are fixed the tools, the kind, the position and dimensions of the various wheels, because it is for the builder to calculate the motions which ought to produce the desired effects, and to prevent the action of one part from interfering with the performance of another.

It is useless to say, after the title of the present description, that everything must be calculated in such a manner that, with the same machine, one may tongue and groove boards of any thickness, width, or length; thus the saws, plough planes, or tool carriers, &c., must necessarily be susceptible of being set at any desired distance from each other; and the saws *b*, *c*, must be arranged so as to be set at any angle in inverse directions, according to requirements.

The machine of my invention, which I am now describing, combines all these advantages, and can easily, attended only by one man, having the boards within convenient reach, operate in twelve hours on from two to three thousand feet of boards.

To plane or bring down to a thickness a board of any kind, (the drawing of this machine not being attached to this paper, we can only give a description of it,) the board is presented edgeways on rollers, whose axles are placed horizontally. Two fluted cylinders, placed

vertically and parallel with each other, press the board on both sides. The boxes of one cylinder are stationary, those of the other slide in grooves, in accordance with the variations in thickness of the boards to be planed. The operation of a spring or weight upon the back boxes, causes an even and constant pressure to be made by the cylinders upon the board.

Two tool carriers, armed with double ironed planes, laid obliquely and in a contrary direction, are moved backwards and forwards by a double brace, on which the motor wheel is attached at one of its extremities.

One of these tool carriers, (performing a quick backward and forward motion,) is neither to go up or go down, nor to or from the board; it is the board which comes to it; while on the contrary the other is moveable.

When the board is reached and brought down to the required thickness, the tool carrier meets rollers, against which it rubs, and which prevent the irons from taking further hold on the board.

The rollers must be mounted so as to shift backward or forward, since it is the distance between them which regulates the thickness of the boards; springs or weights gradually bring the tool carrier to meet the board.

Besides the two cylinders, of which we have just now spoken, there are two others at the extremity of the frames, equally placed vertically; but they are stationary in their boxes, because when the board reaches them, it has undergone the whole operation, and is then brought down to the required thickness, and needs these last cylinders only to direct its coming out of the machine, after having passed the introducing cylinders.

All the cylinders carry at their top a wheel, the diameter of which must be calculated according to the thickness of the boards worked; the two first work into each other, the last do the same.

Above each wheel is placed either a toothed wheel for an endless chain, or a treble brace, which by hand moves the four cylinders together. The first two cylinders conduct the board to be operated upon.

April 28th, 1825.—Patent addition and improvement to M. De Manneville, (Leonore Thomas,) at St. Quintin.

In the description of my means of execution, deposited at Paris, in the office of the department, on the 18th day of December, 1824, in which I fear not to have been explicit enough, I said, "the board intended to be grooved is previously well secured upon a carriage progressing between conductors, preventing deviation in any direction, and taking the board conformably to the will of the operator." I then meant a carriage, (conducting the board through the cylinder,) which it was necessary, after having removed the worked board from it, to bring back each time to its former position to receive a new board to work, which necessarily occasioned a loss of time which it is interesting to prevent.

This system, which I do not however give up in the case of some

particular work, had the inconvenience to compel the workman, at each piece of lumber operated upon, to change his position; at first it was necessary for him to fasten his board upon the carriage, in front of the cylinder; then go behind the latter to take off the worked board, then come back again in front to restore the carriage to its first position to place upon it a new board. This manner of operating compelled the workman to a continual motion, fatigued him, and caused him a considerable loss of time. In order to obviate that, two men would have been required, one in front, the other behind the cylinder, whence would have resulted an increase of one hundred per cent. in the cost of workmanship.

I have now found a means which dispenses with any operation back of the cylinder, saves much time, and simplifies infinitely the operation. Here is wherein consists this improvement.

The conductor, which at first was made of one piece, as almost all conductors, is now formed of a number of small pieces, two, four or six inches in length, more or less, connected by means of hinges, and forming then a whole, perfectly even in width and thickness. Each of these divisions carries rack teeth, and also one or two square holes, larger below than above, in which lodge the heads of the bolts which tighten the clamps.

It is by putting together this divided part that I form a sort of chain, which, being perfectly contained in its progress between appropriate guides, forms my new carriage.

When the carriage has gone through the cylinder, and when, in consequence of it, the board has undergone its operation, the carriage folds itself from the effect of its own weight, and the board, by the mere action of the hinges, is freed from the clamps, and drops out of the machine. Then each link being folded beneath the machine, alternately resumes its former place in front of the cylinder to receive a new board to be worked from the hand of the workman, whose sole occupation now is to place fresh boards under the clamps, while the machine, by itself, performs all the work, such as jointing, tongueing, grooving, and throws off the worked boards as fast as they are worked.

I believe it useful to explain that one of my means of pressure on the board, which I meant in my description of December 18, is a spring, carrying at its extremities a small galet with flanges, at least one inch more in diameter than the galet, so that the flanges alone should bear upon the board, and the galet be allowed to pass over the bolts and nuts of the clamps, without touching them in any manner, which would counteract the even and regular pressure which these flanges should constantly make upon the board.

I should have also mentioned, that by the means of the planing tool we may equally produce any kind of moulding on wood; we need only, for that, to adapt in the place of the planes, in the tool carriers, *e*, *h*, cutting tools or burrs, corresponding with the pattern intended to be carved upon the wood.

Caption.

UNITED STATES OF AMERICA,
Massachusetts district, ss.

By virtue of the foregoing commission to me directed, I caused the deponent, Edmund Burke, therein mentioned, to come before me, in Boston, in said district, on the seventeenth day of March, one thousand eight hundred and fifty-one; and he being then and there first duly cautioned and sworn by me to testify the truth, the whole truth, and nothing but the truth, in answer to the several interrogatories and cross interrogatories thereto annexed, did, on the said seventeenth day of March, and also on the eighteenth, nineteenth, twentieth, twenty-first, twenty-second, twenty-fourth, and twenty-fifth days of said March, one thousand eight hundred and fifty-one, respectively, give the foregoing answers, severally, to the interrogatories aforesaid, propounded in behalf of the respondents, and also to the cross interrogatories aforesaid, propounded in behalf of the complainants; which said answers were subscribed by the said deponent in my presence, and the same were by him reduced to writing in my presence, and in the presence of Henry L. Hallett, a disinterested person, appointed by me as a clerk to assist therein, and no person was permitted to be present at the taking of this deposition, except the deponent and myself, and the said clerk. Taken in pursuance of the commission aforesaid, to be used in a cause now pending in the circuit court of the United States, for the Massachusetts district, wherein Artemas L. Brooks et als. are complainants, against John Fiske et al., respondents. Taken on behalf of the said respondents, before me,

B. F. HALLETT,
Com'r of the circuit court of the U. S., for Mass. district.

Commissioner's fees, 125 pages, 8 days -	- $64 00
Deponent's fees, 8 days attendance -	- 10 00
Travel 120 miles - - - -	- 12 00

And I further certify, that the exhibit marked [A, Edmund Burke,] referred to in the deponent's answer to the second interrogatory in chief, on page 9, and also the exhibit B, referred to by deponent in the same answer, on page 11, which is marked [B, Edmund Burke,] attached to the original patent, both of which exhibits are signed by me, [B. F. Hallett, U. S. com'r,] are not attached to this deposition by consent of the parties, and by their consent are to be used by either party in the same manner, and with the effect as if they were attached to this deposition. I also certify, that the words written on the margins of the sheets in this deposition, foregoing, are parts of the answers of the deponent to the several interrogatories to which they are appended and interlined, and are to be taken the same as if in the body of the deposition.

B. F. HALLETT,
Com'r circuit court of the U. S., for Mass. district.

UNITED STATES OF AMERICA,
Massachusetts district, ss.

The circuit court of the United States, within and for the Mas-
[L. S.] sachusetts district, to Benj. B. French, esq., counsellor at law, residing at Washington, District of Columbia.

Know ye, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower you, to take the answers to the interrogatories hereunto annexed of Walter R. Johnson and James J. Greenough, of the city of Washington, D. C., witnesses to be examined on behalf of the respondents, and to be used in a certain cause now pending in said court, wherein Artemas L. Brooks and als. are complainants, versus John Fiske and al., respondent.

And to this end, at certain days, to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you, and each witness, while present before you, to examine carefully on oath touching the premises. And when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence. And the same, so taken and subscribed, to return, together with this commission and your doings herein enclosed, sealed and directed to the circuit court aforesaid, to be holden at Boston, as soon as the same shall have been executed.

In testimony whereof we have caused the seal of the said circuit court to be hereunto affixed.

Witness the honorable Roger B. Taney, at Boston, this twenty-second day of March, in the year of our Lord one thousand eight hundred and fifty-one.

ISAAC O. BARNES,
Clerk of the circuit court of the United States, Massachusetts district.

N. B. You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the depositions, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the deponents whilst giving their depositions in answer to the interrogatories annexed to this commission. And you shall take such depositions in a place separate and apart from all other persons, and permit no person to be present during such examination, except the deponents and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the depositions to writing. And you shall put the several interrogatories and cross interrogatories to the deponents in their order, and take the answers of the deponents to each, fully and clearly.

Circuit court of the United States, Massachusettes district.

BROOKS and others } vs. FISKE and another. } In equity.

Interrogatories to be propounded to Walter R. Johnson and James J. Greenough, of the city of Washington, District of Columbia.

1. State your age, residence, and occupation, and how long you have been engaged in your occupation; and whether you have been accustomed to examine and compare machines and patents with a view to their novelty and identity; and whether you have been frequently, or how otherwise, examined in patent cases as an expert.

2. Are you acquainted with the patent, and its specifications and drawings, granted by the United States of America to William Woodworth, on the twenty-seventh day of December, A. D. 1828, for an improved planing machine, and with the reissued patent aforesaid, granted to William W. Woodworth, administrator of the said William Woodworth, with an amended specification, on the eighth day of July, A. D. 1845; if yea, state whether the said reissued patent describes the same invention as the said original patent, or how otherwise. Is the new patent for the same invention as the old one? State your opinion, and the reasons for the same, fully and at large.

3. Are you acquainted with the patent granted in France, March 15, 1817, with an addition, March 30, 1818, to Messrs. Roguin, for a planing machine; and a patent granted in France, March 9, 1825, with an addition, April 28, 1825, to M. Manneville, for machines for grooving, planing, and reducing to an even thickness, boards, &c.; or with the descriptions of said patents and machines, published in the French work called Brevets d' Inventions, vol. 23, pages 207 to 212, plates 27 and 28, and vol. 41, pages 111 to 116, plate 12? If yea, state whether the same contain, or describe any, and what part of the invention described or set forth in the said Woodworth patent, granted the twenty-seventh day of December, A. D. 1828, or reissued July 8, 1845. State particularly what material parts and combinations, if any, are substantially the same in the said French machines and the said Woodworth machine. How do said machines compare in the mode of operation?

4. Have said French machines, or any of them, rotating planes, in combination with rollers or any analogous device to keep the board in place, substantially like the Woodworth machine, or how otherwise?

5. Could a mechanic, skilled in planing machines, by the aid of said French patents, make the Woodworth machine, or any, and what part thereof, without invention?

6. Are you acquainted with the patent granted by the United States of America to Nicholas G. Norcross, one of the defendants, on the twelfth day of February, A. D. 1850, for an improved planing machine, or any model or machine made according thereto; and are you

acquainted with the said reissued Woodworth patent, or any model or machine made according thereto? If yea, state whether the said Norcross machine is substantially different in structure, principle, or mode of operation, from the said Woodworth machine, or how otherwise. Compare said machines together, and point out the differences in the Norcross machine from the Woodworth machine, and the advantage or beneficial effect of such differences, if any there be.

7. What device has the Norcross machine for keeping the board in place while planing? State whether the same be or be not substantially different in structure and mode of operation from the rollers in the Woodworth machine for the same purpose.

8. Has the Norcross machine any combination of rotating planes with rollers or any analogous device, substantially like the Woodworth machine?

9. Has the Norcross machine either of the combinations described and claimed in the Woodworth patent of 1845?

10. What prevents the rotating planes from drawing the board out of its line of motion, and on to the cutters in the two machines?

11. State whether there be a substantial difference in structure and mode of operation between the solid bench, against which the rotating planes cut, in the Norcross machine, and the pressure rollers in the Woodworth machine; and state which is the best, the bench or the roller, for cutting against, and give the reasons for your opinion.

12. State whether or not the combination of the moveable cylinder with the fixed bed B in the Norcross machine, is substantially different in structure and mode of operation from the combination of the fixed cylinder with pressure roller in the Woodworth machine, and give the reasons for your opinion.

A true copy.

Attest: ISAAC O. BARNES, *Clerk.*

The cross interrogatories propounded by the plaintiffs to certain experts, witnesses for the defendants, to wit, Walter R. Johnson and James J. Greenough, of the city of Washington, D. C.

1. Have you ever before this testified or given affidavits in any cause in court, or in connexion with any application for legal proceedings under the Patent law before any person, court, or officer, in which affidavits or testimony you have given your opinions, or any questions of originality or novelty or of infringement, in connexion with the Woodworth patent? If you have, state how many times you have so testified, at what dates, and whether orally or in writing.

2. Have you ever given any affidavits on such subjects as above inquired of, which were to be used ex parte for publication, or otherwise; if so, how many, and to whom, and at what dates, as near as you can fix them? State also the purpose for which you understood your testimony to have been taken in each and every of the above instances, and at whose request you testified.

3. State what document you have examined as the original patent

and specification granted to Wm. Woodworth, when you first, and when you last, so examined it, and what mark or means of recognising the identity of the instrument so examined you affixed.

4. State what document or draft you have examined as the original drawings of the specification and patent granted to Wm. Woodworth, or as a copy of the same; when you first, and when you last, so examined it; what marks or means of recognising the identity of the drawings so examined, you affixed.

5. State whether you have formed your opinion, in whole or in part, respecting the original patent granted to Wm. Woodworth, from any model of the original, or from having seen said original machine, or any of them; if from a model, was it made at or before the granting of said letters patent, or since then, and by whom was it made, and what mark or means of identifying said model have you affixed thereto?

6. State whether or not any, and if any, which of the devices, the combination of which is claimed in the reissued letters patent, are to be found in said drawings; please to be particular in your description, and append a copy of said original drawings, or so mark and designate the drawings from which you testify, that they may be identified.

7. State whether or not any, and if any, which of the devices, the combination of which is claimed in the reissued letters patent, were to be found in any of the original machines of said Woodworth, which you saw before the year eighteen hundred and twenty-nine; whether or not, and if any, which of the devices, the combination of which is claimed in the reissued patent, were to be formed in the model of the machine by said Woodworth, filed in the Patent office at or prior to the issue of said letters patent, or which you may have made from the original machines by said Woodworth, set in use prior to eighteen hundred and twenty-nine, or which you may have compared with and known to be an exact description of said original machines.

8. State whether or not any, or if any, which of the devices, the combination of which is claimed in the said reissued letters patent, you are unable to find either in the drawings, the authentic model, or the original machines used by said Woodworth, prior to the granting of said original letters patent; and if you answer that all these means of making the comparison are not within your knowledge and command, say how much credit and value you, as an experienced expert, think ought to be attached to the opinions on the reissue, made up without the knowledge or examination of the identical machine, or of all these evidences of the machine on which the letters patent were originally granted.

9. Is not one of the purposes stated in the original patent of Woodworth to reduce an equal thickness; and if yea, can you point out any practical mode of reducing plank to an equal thickness by means of rotating planes, without pressure rollers or their equivalents, for making pressure on that face of the plank which is being planed; and if you can point out any such mode, do so clearly and fully, and if you can, accompany such description with a drawing or drawings.

10. Do you not find in the drawings of the Woodworth patent of 1828, the representation of rollers on each side of the planing cylinder, and on that face of the plank to be planed; and if yea, could the machine have worked successfully on planks of varying thickness, unless the said rollers had been made self-adapting to the varying thickness of the plank; give your reasons fully for any opinion you may express on this subject.

11. If in answer to the third direct interrogatory you shall have stated that you have read the descriptions, and examined the drawings of patents, granted in France on the 17th of March, 1817, and 30th March, 1818, to Messrs. Roguin; and also on the 9th March, 1825, with additions on the 28th April, 1825, to Mr. Manneville, state whether you have seen the original patents granted in France, or authenticated copies thereof granted by the Government of France, or whether they were copies purporting to have been extracted from a certain French work, entitled "Brevets d' Invention;" and if the latter, or translations thereof, please state if you have examined the said work, and give the date of its publication; state whether you read the French language, and whether in testifying as to these French inventions you have relied on your own knowledge of the French language and the examination of the said work, or on the translations. Have you any knowledge, other than the publication of the work referred to, of the dates of the said patents, and if so, what?

12. What knowledge have you of the year when said printed work, referred to in the third direct interrogatory, was published? State fully, and give the sources whence you derive this knowledge.

13. If you shall have stated that you find in the French patents of Roguin and Manneville substantially the same combination as in the Woodworth patent of July 8, 1845, state particularly whether you find said combination in any one, and which one, of the said patents, or whether to find the said combination you would have to refer to all, or how many, and which of them.

14. If, in answer to the fourth interrogatory in chief you shall have stated that you find in the French patents to Roguin, of March 15, 1817, and March 30, 1818, the combination of rotating planes with rollers, or any analogous device to keep the board in place, substantially like Woodworth's, give in your answer the words of the said French patents which describe such combination, and the letters on the drawings which designate the parts constituting such combination. Do you or not find in the said French patent of March 15, 1817, that the plank is to be held to and secured on to the carriage by dogs or clamps? Is not the cylinder or rotating instrument for reducing the face of the plank formed with cutting edges, cut out of a solid block of metal, and resembling what is known among mechanics as the burr-cutter, in contradistinction from planes for shaving wood, and if you find these otherwise, state fully why, and in what particular, they are otherwise? Besides the cutters, do you find in this French patent of 1817 anything described or represented as passing or lying over the surface of the

plank to be planed, other than a cross piece marked with the letter *x*, called a guide, and if so, please state whether you find, either described or represented, any mode by which the said cross piece or guide is either pressed down upon the surface of the plank, or made to yield to any varying thickness of the plank? Do you find any such cross piece or guide stationary or yielding on both sides of the rotating cutters, and if only on one side, could a machine for planing answer a good practical purpose with only one? If, in the patent of March 30, 1818, you find rotating planes, do you find these combined with a pressure roller, or its equivalent, and if so, point out the letters by which it is designated in the drawings. If, instead of a roller you find a cross piece or guide, as in the patent of 1817, please state whether you find either from the description or drawing that this said cross piece or guide is made self-adjusting to the varying thickness of the plank, and if so, point out the same in the description and drawings. Is not the said cross piece or guide represented as permanently attached to the same carriage with the planing cylinder, which carriage moves on the frame from end to end of the plank that rests on the main frame, and is it not stated in the said specification that the carriage, which carries the planing cylinder and guide, is to weigh about 200 pounds? If yea, could, in your opinion, a practical working machine be made on this plan? Would such a weight be sufficient to hold down the planing cylinder? The planing cylinder and guide being connected together in the same moveable carriage, would not the two, if they yielded at all, yield together, and thus plane the plank to a varying instead of an equal thickness?

15. If, in answer to the fourth interrogatory in chief, you shall have stated that in the French patent of Manneville, granted March 9, 1825, and the additions thereto, granted April 28, 1825, you find the combination of a planing cylinder with pressure rollers or their equivalents, point out the parts of the description and drawings relating to such combination. Is it not stated in said Manneville's first patent that the plank to be tongued and grooved is to be securely adjusted on a carriage, and if you shall have stated that you find in the said patent a pressure roller, is not such roller to be used in connexion with some plan of securing the plank to the carriage? Specify particularly in what manner this roller is to be applied, and whether, in your opinion, such mode of application is practicable, and if so, why it is practicable. In your opinion, could a machine be made practically useful with only one such pressure roller, unless in connexion with it some plan was adopted for securing the plank to the carriage? Is the mode of tongueing and grooving plank, in said patent, by means of one cutter wheel on each side, or by means of circular saws, five saws being used for the tongue and three for the groove, together with reciprocating cutters for finishing the groove? If, in your opinion, this mode of tongueing and grooving planks is substantially similar to Woodworth's plan, give your reasons fully for such opinion.

16. In your opinion would the mode of applying the roller, describ-

ed in said Manneville's patent, prevent the plank from moving laterally whilst being tongued and grooved; and if yea, point out what is described or represented for preventing the lateral vibration of the plank?

17. Can you understand every part of the description of the said Manneville's patent, and if so, describe the mode of construction referred to in that part of said patent, in which he states that he has enclosed the entire mechanism in a cylinder of 18 inches.

18. In the description in said patent of the mode of planing planks, are the fluted pressure and feed rollers applied to the faces or edges of the plank; and if the latter, is it not stated that the plank is to be placed on rollers that have their axis horizontal, and that the two fluted rollers are vertical and parallel. Such being the position of the parts, are or are not the fluted rollers applied to the edges of the plank?

19. Do you understand the construction and mode of operation of the planes for planing the surface or surfaces of the plank described in said Manneville's patent, and if yea, describe the same minutely; and if you can, accompany your description with a drawing or drawings, and do this without the exercise of any knowledge of planing machines derived from other sources.

20. Do you find in the said patents of Manneville, or either of them, the combination of rotating planes with pressure rollers for planing planks and reducing them to an equal thickness; and if yea, point out the said combination in the description. Is there any drawing of the planing machine described in the said Manneville's patents?

21. Does or not the addition of the said Manneville, bearing date the 28th of April, 1825, apply solely to a mode of feeding or moving the plank by means of an endless chain of links, to which the planks are secured by dogs and bolts, and to a modification of the roller for taking the warps out of the planks; do or not the dogs and bolts, or either of them, for securing the planks to the links of the chain, project above the surface of the plank; is not the roller grooved for the purpose of admitting of the passage of such projecting bolts; and if yea, how could such mode be applied when planing the surface of the plank without destroying the cutting edges of the planes?

22. If, in answer to the fifth interrogatory in chief, you shall have stated that a mechanic, skilled in planing machines, could without invention construct the Woodworth machine, please state from which of the said French patents; and whether, in your opinion, this could be done by a mechanic having no more skill or knowledge of planing than was known at the time the said inventions purport to have been made?

23. Whether or not, in the Norcross machine, when the plank is being planed and reduced by the action of the cutters on one of its sides, the other side is held firmly against a plate, bed, or rest, to prevent vibration taking place whilst under the action of the knife, and to secure the reduction of the board to an equal thickness.

24. Whether or not, in the Woodworth machine, when the plank is being planed and reduced on one side by the action of the cutters, the

other side of the plank is held firmly against a solid bed or rest, to prevent vibration taking place whilst under the action of the knife, and to secure the reduction of the board to an equal thickness.

25. Whether or not, both in the Woodworth and in the Norcross machines, there are rotary cutters to place the board, and some mode of keeping the plank in contact with the rest to reduce it to an equal thickness.

26. Whether or not in each machine the board is by the rotary cutters reduced to an equal thickness at the same time that it is planed, and if not, how otherwise?

27. What substantial difference, in the process by which the board is planed and reduced to an equal thickness, exists in the two machines?

28. What substantial difference, if any, exists in the result of the two machines, and whether that difference, if any, is a change in principle, and if so, of what principle of the Woodworth machine, and how is that principle changed?

29. State whether or not the mechanical devices in the Norcross machine effect any new and useful change in the operation of planing boards; if so, what is the new principle that is by said Norcross machine introduced into the art of planing boards which was before unknown?

30–31. Whether the mechanical devices in the Norcross machine supersede the necessity of feeding the boards to the cutter; of holding the board firm against a bed or rest whilst its opposite side is being planed; of preventing the board from being drawn towards the axis of the cutters by the operation of planing; of planing and reducing to an equal thickness by the same operation; of arranging the machines to admit boards of varying thickness to be fed to the cutter; of adjusting the periphery of the cutter at a fixed distance from the bed or rest, which is on the opposite side of the plank or board, to determine the exact thickness that shall be left after being planed; of having the surfaces, between which the plank passes, vary in their distance from each other to accommodate the varying thickness of the plank, whilst the cutting cylinder and the rest opposite to it remain at the same distance apart; of having this varying distance of surfaces self-adapting by pressure, to keep one face of the plank against the rest.

32. If you have answered at any time, to any questions respecting the principles of the plaintiff's or defendant's machines, please state carefully what definition you attach to the term "principle" of a machine, and whether you understand the use of analogous devices or mechanical equivalents in a machine, to change the principles of such machine.

33. What have been your means of acquiring an expert knowledge of mechanics, and how much time have you spent in acquiring such knowledge; how long have you been an expert, and how often have you before testified as an expert; how many years were you a practical mechanic, and in what branch of mechanics were you practically engaged?

organization of the machine. If the board was made to rest on the carriage, and was set at different heights thereupon, as described in the original patent, there would be no pressure rollers required; the terms used imply that the board was attached to the carriage, which would be absolutely necessary to be done in order to have the carriage move the board up to the cutters; and as this is clearly stated to be the mode of operation, and no mode of moving the board independent of the carriage is suggested, any competent mechanic, from that description, would set the plank so as to pass through with the carriage, which would not require invention. In the drawing now on the files of the Patent office, with a certificate stating it to have been copied from a certified copy of William Woodworth's original patent, there is in the margin a reference by letter to the drawing, in which several parts in said drawing, lettered (*f*,) are stated to be rollers; some of these rollers are fixed horizontally, and others vertically; those that are fixed vertically next to the cutting cylinder are certainly not pressure rollers, nor could they be made to perform the office of pressure rollers without several material changes and the addition of important elements; and if pressure rollers were considered by the inventor Woodworth essential to the proper working of the machine at the time he obtained his original patent, I can conceive of no more effectual way to conceal that fact than has been here adopted by the patentee. Again, in the original patent of 1828, no mention is made of planing from the planed to the unplaned surface, while this is carefully set forth in the reissue; if the cutters should be made to act in the opposite direction, their tendency would be to press the board down, and would thereby dispense with the requirements of the pressure rollers; this state of things we have quite as much authority for, as the reverse, from the patent. The original patent of 1828, describes setting the board on the carriage so as to reduce it to any thickness required to be planed; but in the reissue a new feature is wrought into the description, which not only is not introduced in the original, but could not be employed when two boards were being planed on different sides of the wheel.

Answer to the third interrogatory. I am acquainted with the patent granted in France, 15th March, 1817, and with the addition thereto dated 30th March, 1818, to Messrs. Roguin, for a planing machine; and I am also acquainted with a patent granted in France, 9th March, 1825, and an addition thereto, granted 28th April, 1825, to M. De Manneville, for machines for grooving, planing, and reducing to an equal thickness boards, &c. All of which descriptions are published in a well known work under the superintendence and by authority of the French Government, entitled "Descriptions des Machines, et procédés spécifiés dans les Brevets d' Invention," a work published in Paris, in a continued series of many volumes, from 1811 up to the present time. In the addition to the patent of M. M. Roguin, above named, granted in 1818, there is distinctly described a cutting cylinder, with separate knives bolted thereto, projecting beyond its periphery; and an end view of said cylinder, with the knives attached thereto, is

shown in plate 28, of volume 23, of the above named work, together with a detached knife, distinctly and perfectly delineated, sufficiently for practical construction, and, in all essential particulars, like the cutting cylinders now in common use in all the cylinder planing machines with which I am acquainted. In the plate above named this cylinder is represented as being placed in bearings on a carriage with bars, called guides in the description, that would effectually keep down the board and prevent it from rising; should there be any tendency so to do, this guide as well as the cutting cylinder is kept down by the weight of the carriage in which they are located, which we are told in the description must be sufficiently heavy not to be lifted up by the action of the tool upon the wood in planing; these bars produce precisely the same effect as rollers would in the same position. There are two different kinds of rotary cutters named in this patent and addition, both of which, however, have the guide before them, to hold down the board. In the machinery described by M. De Manneville, above named, the tongueing and grooving is performed by rotating cutters, as well as in that of Roguin; and in this instance he holds down the board, while being tongued and grooved, by weighted pressure rollers distinctly described. In his description he mentions two distinct modes of grooving a board; one is by means of two circular saws, which cut a score on each side the width of the groove to be made, the centre part being removed by a set of irons, one above the other, having a reciprocating or backward and forward motion, like an ordinary plough plane, having several irons in it. The other tool for this purpose is described as a tool carrier, armed with several irons shaped like plough planes, and placed on a vertical axis, by the motion of which the groove is cut. This is precisely like the device used by Woodworth for the same purpose, and has, in combination with it, the device named and so claimed in the reissued patent of 1845, namely, the pressure rollers which bear upon the board at the point where these tools operate; the mode described of weighting these rollers is precisely the same as is generally employed in the modern Woodworth machines. In this patent of Manneville's is also clearly described pressure rollers for feeding in the board to be planed on its broad surface; the above named machines have, therefore, a cylinder plane combined with a guide to hold down the board, equivalent to pressure rollers; in them is also to be found the combination of pressure rollers, with rotary, tongueing, and grooving apparatus, also found in the claims of the reissued Woodworth patent, and from these patents, any and all parts necessary to and used in the modern machine, known as Woodworth's, are to be found clearly described.

Answer to the fourth interrogatory. I have fully stated in my previous answer to the third interrogatory that I did find such a combination.

Answer to the fifth interrogatory. A mechanic skilled in planing machines could, without invention, make a rotary planing machine with the cutting cylinder, precisely like the modern planing machine,

and with pressure rollers to hold the board to its place, and feed it up to the cutters, in all essential particulars, like the modern machine known as Woodworth's.

Answer to the sixth interrogatory. I am acquainted with the patent granted to N. G. Norcross, a defendant in this suit, granted by the Government of the United States, the 12th February, 1850, for an improved planing machine, and have seen a machine made after his plan at work. I have seen the modern machine, commonly called Woodworth's, operate, and am well acquainted with its action. The construction and mode of operation of the two machines is materially and substantially different; their purpose, in common with the machines I have already named, and many others, are the same, namely, reducing boards to an even thickness; but this is not suggested in either patent as forming any part of the invention; both inventions are patented as improvements in planing machines, clearly indicating that machines for this purpose were not new, in accordance with fact and history; consequently the specific modus operandi of each machine is alone patented; and I have rarely seen machines to effect the same purpose more different in their general construction, the parts claimed in each being wholly omitted in the other. The Norcross machine is an improvement on a machine patented in England by Samuel Bentham, and described in the tenth volume of the Repertory of Arts, published in London in 1799, and on some other machines subsequently invented, prior to the patent of William Woodworth, and like those machines the cylinder is situated below the board, and projects up through an aperture in the bench, upon which the boards rest to be planed; the knives thus are made to cut against a stationary breast formed by the permanent bench. The cylinder in the Woodworth machine, instead of cutting against a solid permanent breast, cuts against a roller, which is made yielding, and consequently is liable to, and does in practice, vibrate to a certain extent, so as to cause the boards to be cut, more or less, in ridges, and leave the surface to a degree rough, or unfit for painting, without being smoothed by hand planes. In the machine of Norcross the board is, so far as the action of cutting effects it, between two unyielding surfaces; for in the act of planing the action of the knives, which tends to throw off the board from the cutter cylinder, is resisted by the rest bar on the opposite side, which bar is held in place by the reaction of the cylinder, to which it is unyieldingly connected at a fixed and determined distance, which regulates the thickness of the board; between this and the cutter wheel the board passes; the bench, upon which the board rests, is also a permanent fixture, consequently it is cut between two permanent clamps. Instead of being cut upon a permanent bed, upon which it is held by a yielding material, namely, the yielding pressure rollers in the one case, the most powerful action of the knives will cause no yielding of the clamps which hold the board, while at the same time the board itself, however unequal it may be, finds a ready admission between them; but in the other case, the pressure rollers will yield if an unusual force is brought

to bear upon them, unless their force is so great as to impede the action of the machine. Therefore, it will be obvious that the machine of Norcross must plane boards exactly parallel on their two surfaces, while the Woodworth machine will only approximate, as is well known in practice; that result, for the very nature of the machine, called Woodworth's, cutting against a yielding roller, renders a completely perfect action impossible, while acting on a substance of unequal resistance. In the machine of Norcross, the board is so bent as to form a concave surface, at a point when the cutters act upon it, thereby condensing the grain and preventing knots, loose or otherwise, from being displaced or cut out, causing the work to be done smoother and more even than if the board passed through straight, as in the Woodworth machine; this effect is just in proportion as the board in its curve approximates the curve of the cylinder. In the machine called Woodwood's there is no such device. The advantages of the Norcross machine over those called Woodworth's, are greater stability of parts at the working points, and the execution of more perfect work, and this results from a new modification of elementary parts, which is not to be found in the other machine; thus clearly showing that the change is not merely nominal, and that the machines are not substantially the same, but are essentially different machines to effect the same purpose; improvements, in both cases, upon old machines. In the description and claims of the reissued patent*ed* granted to W. W. Woodworth, administrator of William Woodworth, certain well known elements of machinery, that were known to have been used before in planing machines, are there claimed in combination, namely, pressure rollers and a cylinder cutter, clearly showing the parts the mechanician should look to in constructing a machine on this plan. The only element found in the machine of Norcross, like what is now used under the reissued patent, but the construction of which as now used, not described in it, is the cylinder cutter, and that instrument is clearly described and represented in the French patent of M. Roguin I have before named. The construction and combination of all the other parts and instruments used in the machine of Norcross, (except the feeding apparatus, which is claimed by neither, and which is very old in planing machines, and was well known long before either of these patents were granted,) are radically different from those of Woodworth, and their mode of operation is different, the result being an improvement in the machine of Norcross in more particulars than one.

Answer to the seventh interrogatory. The device for holding the board firmly in place in the Norcross machine consists of an apparatus that may properly be called clamps, that are so dvised as to be wholly unmoved by the action of the cylinder in cutting either above or below the board, instead of cutting against a yielding roller held down by a spring, as I have before described; consequently they are substantially and mechanically different in structure and mode of operation from Woodworth's machine.

Answer to the eighth interrogatory. The Norcross machine has no

combination of rotating planes and rollers, and its cutting apparatus, as in the machine called Woodworth's.

Answer to the ninth interrogatory. The Norcross machine has neither of the combinations described and claimed in the Woodworth patent of 1845.

Answer to the tenth interrogatory. In the Norcross machine a stationary permanent bed prevents the board from approaching the cutters too far; in the Woodworth machine they are prevented from being drawn in, should they tend to do so, by yielding rollers held down by springs or weights.

Answer to the eleventh interrogatory. There is a substantial difference between cutting against a solid plate or bench, and a yielding roller; it is obvious to any mechanician, that the more permanent the parts of a machine are, against which such an operation as planing or cutting wood is performed, the more perfect will that operation be. In the machine of Norcross, the board cannot be moved out of place, either up or down, by the action of cutting, even in cases where the material is ever so unequal; but in that of Woodworth, the board will be acted on, and the tendency will be to vary the action as the material is harder or easier to cut, thus varying the thickness of the board when planed, and producing more imperfect work.

Answer to the twelfth interrogatory. The combination of the moveable cylinder with the fixed bed in Norcross' machine does differ substantially in its construction and mode of operation from that of Woodworth, for the reasons I have already given.

Cross interrogatories.

Answer to the first cross interrogatory. I have given testimony in court and elsewhere, affidavits orally and in writing, of my opinions as to the novelty and originality of the Woodworth patent, but I am unable to state how many times.

Answer to the second cross interrogatory. I am not aware of ever having given affidavits ex parte to be used for publication, but I have given ex parte affidavits in relation to the Woodworth machine, but cannot fix the dates with any accuracy at the present moment. I have recently given testimony in a case that I understood from counsel was to [be] used in a case now pending in North Carolina. I also gave testimony orally in a case in which one Brown was respondent, in Baltimore. I have further given testimony to be used in similar cases in New York and elsewhere.

Answer to the third cross interrogatory. I have examined the original patent itself now deposited in the Patent office, and the two copies of restored drawings, the original not having, as was the case with many early patents, any drawing attached to it. I cannot say how early I examined said patent first, but I last examined it within a few days. I attached no mark to the instrument, but have no doubt I could recognise it again.

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Answer to the fourth cross interrogatory. I have not seen the original drawings of William Woodworth that I remember, but I have seen in the Patent office certain drawings, on the back of which is the affidavit of William Woodworth, that they are duplicates of the ones deposited in the Patent office, on which his patent was granted, and on which there are no letters of reference; and also another drawing purporting to be a copy of a certified copy of the drawing of the original patent; on this drawing are letters of reference, and on the margin an explanatory legend not found in the original patent. These are the only copies I have found on the records of the Patent office referring to the original patent, after a careful and thorough examination of the office. I have also seen several copies of these drawings, but have not marked any of them that I am aware of.

Answer to the fifth cross interrogatory. I have not formed my opinion of the original patent of William Woodworth from the inspection of any model or machine which I have seen.

Answer to the sixth cross interrogatory. I do not find in the drawings named in my answer to the fourth cross interrogatory the devices claimed in combination in the reissued patent granted to W. W. Woodworth, administrator of William Woodworth; but, on the contrary, there are no pressure rollers, or anything that could be used as such, on either of them. I have had no drawings before me in giving this deposition, and have none to append hereto; but I have a thorough recollection of all the drawings I have named, from repeated careful examination of them.

Answer to the seventh cross interrogatory. I have never seen a machine or model that I know to have been made previous to 1829.

Answer to the eighth cross interrogatory. I find, in the drawings named in my answer to the fourth cross interrogatory, a cutter cylinder and tongueing and grooving cutters; and these are the only parts which I do find that are parts of the combination patented in the reissue. There are not any pressure rollers, as I before stated, in said drawings.

Answer to the ninth cross interrogatory. The patent of Woodworth, in common with most of the other patents for planing machines that preceded his, states one of the objects to be planing to an equal thickness; and a mode was early pointed out for holding boards while being planed, in the well known patent of Bramah, described in Rees' Encyclopædia, under the article "planing machine," described and patented long before the patent of Woodworth, without pressing upon its surface; this is one of the devices to hold the board down when a carriage is used, and the most obvious, when none other is named. The device of Norcross is another, where pressure rollers are dispensed with; the carriage not being here employed. Another device, of a different character from either, was made a few years since by Haggard Knowles, for the same purpose; and that of Woodworth is still another; all of which are different from each other.

Answer to the tenth cross interrogatory. I do find in the drawings,

named in the answer to the fourth cross interrogatory, certain cylindrical standards, which, in the copy of the certified copy of Woodworth's original patent above named, are called rollers; but they could not, as I have before stated, be used as pressure rollers; invention would be required to adapt the parts so as to dispense with the carriage, and then pressure rollers might probably be adopted by a good mechanic; but if a carriage was used, and the board fastened to it, it could be planed without pressure rollers. I do not consider that the patent of Woodworth described a machine that could be practically worked without a change of parts requiring invention; for instance, the cylinder for planing, as particularly described, would practically be of no value, and could not be worked to practical advantage; and I have no knowledge of its ever having successfully operated; a cylinder like that described and figured in the French patent of M. Roguin, herein before named, having been substituted for it.

Answer to the eleventh cross interrogatory. I have read the descriptions of the patents granted to M. Roguin and M. de Manneville, in the French work, Brevets d'Invention, of which I spoke in my answer to the third direct interrogatory. It is a work commenced in 1811, and continued up to the present time in a series of volumes, under the authority of the French Government. I have read these descriptions in the French, and have relied on my knowledge of it, for the purpose of this affidavt. I have no other knowledge of the dates of those patents than the work above referred to, in which I found them.

Answer to the twelfth cross interrogatory. I derive my knowledge of the dates of publication of this work from the work itself, and from various learned gentlemen with whom I have conversed in France and England on the subject.

Answer to the thirteenth cross interrogatory: I find such combination as is claimed in the reissued patent of Woodworth in both said French patents.

Answer to the fourteenth cross interrogatory: I find in the patent of M. Roguin, granted 15th of March, 1817, a description to a part on the drawing, lettered *x*, as follows: "*x*, Traverse en bois nommée le guide;" and in that of the addition of March 30th, 1818, is the following: "le guide représenté dans la primière machine, par la letter *x* est, dans la nouvelle machine, porté par le chariot;" the adjustability of this guide is not named any more than that in the Woodworth machine. In the patent of the 15th of March, 1817, dogs are named to hold down the board; but in the addition of 1818, these dogs are dispensed with, as the guides there can evidently, from their construction, rise and fall with the carriage, should occasion require. In the patent of 1817, burr cutters are described; the addition thereto of the next year describes particularly the cutting cylinder, used by the plaintiff and defendant in this suit. It is stated, in said patent of M. Roguin, that the carriage and all its parts weighs about one hundred and ten kilogrammes, and adds thereto the caution that it should be sufficiently

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heavy not to be lifted up by the action of the tool upon the wood. This is a clear and sufficient description for practical purposes, and more than is often given in patents, that the carriage must be sufficiently heavy for the purpose; the weight however named, of about two hundred and forty pounds, would be enough for many practical operations, depending upon the kind of material and the magnitude of the work. I do not think this machine would be more likely to plane unequally than in the case of the pressure rollers employed by Woodworth.

Answer to the fifteenth cross interrogatory. The patent of Manneville contains the following sentence: "La planche qu'on vent bonveter est prealablement bien assujettie sur un chariot marchant entre des conducteurs qui ne lui permettent de variation en aucun sens, et qui apporte le bois au travail conformément à la volonté de celui qui opere." I give the following as a translation of this passage: The board which is to be grooved is first well placed upon a carriage progressing between conductors allowing of no deviation in any direction, and carrying the wood up to the work, conformably to the will of the operator. The patent then immediately goes on to say, that, in order to prevent the board from being presented to the tools with any bend or warp in it, a pressure is made use of whose weight rests by means of a roller on the board at the place where it is to be operated on; the presser may be increased or diminished by a motion of the foot or otherwise, causing the weight to slide to the right or left as required; the parts composing this presser are described as a device like a common steelyard, with a roller between the fulcrum and the weight; or any other efficient system of leverage to produce the effect of holding down the rollers and thus keeping the board to the work; no other means of holding the board is named in this connexion, and I consider it perfectly practicable, and is now in common use, and claimed in Woodworth's reissued patent. There are two modes described of grooving planks, one by means of two thin saws parallel to each other, and at a sufficient distance apart to form the sides of the groove with a reciprocating cutter, to cut out the centre part left between them; the other is a tool holder having several cutters on it resembling plough planes, which tool holder is mounted on a vertical axis; these neatly cut out the wood forming the groove, which I deem perfectly practicable, and substantially the same in all particulars with the grooving apparatus described and claimed in the reissued patent of Woodworth.

Answer to the sixteenth cross interrogatory. I see no reason why the rollers in Manneville's machine should not perform the same office they do in the Woodworth machine; their action would be exactly what is so carefully and minutely set forth in the claim of Woodworth's reissued patent.

Answer to the seventeenth cross interrogatory. Some parts of the description of Manneville are too general to make out all the details of his invention, but in those portions to which I have referred there seems to be no ambiguity. The part to which this interrogatory relates I consider simply describes a case of given dimensions, into which all the other parts, if properly proportioned, could be put.

Answer to the eighteenth cross interrogatory. In Manneville's apparatus for planing planks, the fluted, pressure, and feed rollers are applied to the faces of the board and not to its edges. The board is clearly described as being fed into the machine on edge, and there are also described horizontal rollers for the edge of the board to rest upon; there are no drawings of this part of the apparatus, but there is no difficulty in perfectly understanding it, and it is perfectly illustrated in the drawing of Woodworth, described in my answer to the fourth cross interrogatory, except the substitution in that drawing of a carriage for the pressure rollers of Manneville distinctly described.

Answer to the nineteenth cross interrogatory. The description of the planing apparatus in Manneville's patent for the face of the board, in the absence of drawings, is not sufficiently distinct to describe with confidence; I consider it the most obscure part of the specification.

Answer to the twentieth cross interrogatory. The last answer applies equally to this question; the pressure rollers are undoubtedly there.

Answer to the twenty-first cross interrogatory. The addition to the patent of M. Manneville, bearing date April 28th, 1825, does not apply solely to feeding or moving the plank by means of endless chains, and a modification of pressure rollers; in addition thereto are named tools to take the place of the grooving tools for cutting mouldings, &c.; without the drawings, which I have never seen of this addition to Manneville's letters patent, I would not venture an opinion upon its construction, further than to say, I see nothing to indicate the difficulties pointed out in this question.

Answer to the twenty-second cross interrogatory. The machine of Roguin is described as having precisely the modern cylinder, plane, and a guide bar to hold down the board, consequently no knowledge of subsequent inventions would be required to make a planing machine having these features.

Answer to the twenty-third cross interrogatory. In the Norcross machine the rest bar which holds up the cylinder to its place, and guides it to plane properly, is sustained by the board itself while planing, and the board is supported on the bench which sustains the whole apparatus, by means of which arrangement of parts the board is clamped upon the solid bench, through which the cutters project to plane off more or less, according to the inequalities of the thickness, the rest being made moveable, firmly connected with the cylinder for that purpose, and is thus prevented from vibrating while being planed on the side next the bench.

Answer to the twenty-fourth cross interrogatory. In the reissued patent of Woodworth's machine, the plank is held down on the bench by yielding rollers, an imperfect apparatus for perfect stability, while the board or plank is being planed on the side opposite the stationary bench.

Answer to the twenty-fifth cross interrogatory. In the machine of Woodworth, and in that of Norcross, as well as in all other rotary planing machines, there are rotary cutters to plane the board, and some

mode of keeping down the board while being planed; several examples of which I have already given.

Answer to the twenty-sixth cross interrogatory. The purpose of these machines, as of all others, is to plane boards to an even thickness.

Answer to the twenty-seventh cross interrogatory. The cutting cylinders, in both machines, are the same; the mode of causing them to act upon the board different.

Answer to the twenty-eighth cross interrogatory. The machine of Norcross would make better work than that of Woodworth, and with a less expenditure of power, the reason for which is a change of mechanical construction. Not knowing what is meant in the question by the word principle, and well knowing its vagueness without a definition, I cannot answer that portion of the question relating to principle.

Answer to the twenty-ninth cross interrogatory. I have before stated a beneficial result arising from the peculiar construction of Norcross. The latter part of this question I cannot answer, without first having the word principle defined. The modus operandi differs, as I have before fully described, from that of Woodworth.

Answer to the thirtieth cross interrogatory. I presume if no board was fed into the machine it would not plane one, and if it was not held while planing, I do not think the greatest genius would be able to find means to plane it. Norcross, in common with every other person who ever attempted to plane a board by machinery, first feeds it into the machine, and then causes it to be held while planing. He also performs all the other long list of common-place things enumerated in this interrogatory.

Answer to the thirty-second cross interrogatory. I have not used the word principle in any of my answers to explain any parts of a machine, for I consider it too indefinite a word to be thus employed, and therefore never thus use it.

Answer to the thirty-third cross interrogatory. My means of acquiring a knowledge of mechanics has been a study of its various branches for more than twenty years, with a constant opportunity to see practical illustrations in almost all the branches of industry; during thirteen years I have been in constant communication with the Patent office, and many of the most prominent mechanics and shops in this country, as well as having visited a large number in Europe. I am unable to define the exact time I have been an expert, or how many times I have testified as an expert; such trivial matters I have never thought it worth while to make a note of. If by practical mechanic, in the question, is meant a manipulator, who understands the use of tools, I have been, more or less, in the habit of employing my time in the use of the ordinary tools of trade ever since I was ten years old; and I have been frequently professionally consulted as an engineer in the practical introduction of machinery.

Answer to the thirty-fourth cross interrogatory. I never have.

Answer to the thirty-fifth cross interrogatory. The question needs defining before I can answer it.

Answer to the thirty-sixth cross interrogatory. The modus operandi of the Woodworth machine, as described in the reissued patent, consists of a revolving cylinder in a fixed or adjusted bearing which planes the board to an even thickness, while they are held down against a stationary bed by yielding pressure rollers.

Answer to thirty-seventh cross interrogatory. I do not consider the employment of bars as is found in the Roguin machine a change in the mode of operation substantially different from rollers, nor do I think that inverting this machine merely would change its character; it certainly could not be patented, and would be deemed substantially the same thing.

Answer to the thirty-eighth cross interrogatory. So far as I understand this question the mode of operation would be different from that now employed by Woodworth, but I do not know what is meant by the bed and rest always retaining the same relative positions.

Answer to the thirty-ninth cross interrogatory. A machine constructed as described in the thirty-eighth cross interrogatory would be unmechanical and would be found very difficult if not impossible to work, and no good mechanician would ever make such a machine. It differs from the machine of Norcross, as the foot of a fly differs from that of animals that walk on the ground only, instead of in the reverse position, requiring many things that this does not to work it; the gravity of the cylinder operates against its own action upon the material, aided by the varying weight of the plank to be planed, the force of the blow of the tool and the rest or bed; while in the machine of Norcross all the parts are adapted to and harmonize with each other, constituting what is known as an organized machine, while the said device described in the thirty-eighth cross interrogatory is an unpractical mechanical crudity. Nothing is more common in examining machines to draw forced similies between them, than by the course pursued in the thirty-seventh and thirty-eighth cross interrogatory, attempting by small changes, seemingly imperceptible, to change one machine into another; but all such deductions would be sophistical and fallacious.

Answer to the fortieth cross interrogatory. I am not engaged as counsel or attorney for the defendants, or either of them, in the present case, or any other case connected herewith. Nor is my compensation in this case, or any other case, to be decided in a court of law, contingent.

Answer to the forty-first cross interrogatory. I have not been consulted as counsel by N. G. Norcross on any question of infringement between his machine and the Woodworth patent, for which I received, or am hereafter to receive, a contingent compensation.

J. J. GREENOUGH.

DISTRICT OF COLUMBIA,
Washington county, ss.

The said J. J. Greenough having been duly sworn, subscribed the within testimony on the 4th day of April, 1851.

Before me. B. B. FRENCH, *Commissioner.*

Deposition of Walter R. Johnson.

Answers of W. R. Johnson, to the interrogatories and cross interrogatories annexed to the commission directed to B. B. French, of the city of Washington, authorizing him to take the testimony of said Johnson, to be used in the circuit court of the U. S. for the district of Massachusetts, to be used in said case of Brookes et als. vs. Fiske et al. there pending.

Answer to the first interrogatory. My age is upwards of fifty years, my residence is in the city of Washington, and District of Columbia. My occupation is that of a civil and mechanical engineer and solicitor of patents. I have been accustomed to examine and compare machines and patents, with a view to their novelty and identity. I have been frequently called upon as an expert to give testimony in patent cases.

Answer to the second interrogatory. I am acquainted with the original patent, and its specification, granted to William Woodworth on the twenty-seventh day of December, 1828, for an improved planing machine, said to be for planing, tongueing, grooving, and cutting into mouldings, plank, boards, or any other materials, and for reducing the same to an equal width and thickness, and also for facing and dressing brick, and cutting mouldings, or facing metallic, mineral, or other substances. I have seen a drawing purporting to have been entered at the Patent office some time in November, 1842, bearing on it an oath of William Woodworth, taken in the year 1838, testifying that it truly represents the machine for which a patent was granted to him on the 27th of December, 1828. I have also seen another drawing in the Patent office, purporting to be a copy of an authentic copy of the original drawing on file in the Patent office, and is the one entered when the patent was restored. It bears date of 13th November, 1843. I am acquainted with the patent granted as a reissue to William W. Woodworth, administrator of William Woodworth, deceased, with an amended specification, on the 8th day of July, 1845. I have read the specification and examined the drawings pertaining to said reissued patent. I find that the reissued patent of 1845 differs in very material points from that described in the patent of 1828. Though the reissued patent professes to be for the same invention as that which was surrendered, yet it contains no reference to dressing bricks, stone, minerals, metals, or similar hard substances, which were prominently set forth in the first patent, and which it was declared to be the purpose of the machine to face and dress. The title, the specification, and the claims of the patent of 1828, all make distinct reference to the dressing of these hard materials. Along with this omission of one of the main purposes of the machine first patented to William Woodworth, the patent of 1845 also throws out all mention of friction wheels for reducing to a width such materials as required that species of operator, instead of circular saws, for reducing them to a uniform width. At the same time, however, the reissued patent contains a description of a certain mechanical operator, which it calls "reducing wheels," which, it

alleges, are "revolving cutter wheels," used for the purpose of reducing boards to a width, whereas no such thing as a "revolving cutter wheel" is employed in the machine of 1828 for the purpose of dividing boards into strips of equal widths. In this patent the materials of whatever kind were reduced to a width prior to coming in contact with any of the revolving cutter wheels which performed the office of planing, tongueing, and grooving. In case of the slitting of bricks, stones, metals, and other similar materials, not admitting the use of circular saws, the patent of 1828 provided friction wheels for that purpose, but no ingenuity could, I conceive, render friction wheels, which are described in the patent of 1828, fit for slitting boards, and none but the most extraordinary ingenuity could so far distort the meaning of the term "friction wheel" as to bring it to mean a "revolving cutter wheel, resembling in its construction and action the planing and reducing wheel" of the Woodworth patent. The term "reducing wheel" is used in the first patent to mean the same implement which planes, that implement being therein called the "planing and reducing wheel," and the board is therein said to be reduced to a width before it comes to that wheel. No adaptation of that wheel to the purposes of "reducing to a width" is so much as hinted at. Nor is it any where alleged or hinted at, or indicated in the patent of 1828, that the tongueing and grooving cutters are to reduce boards to a width.

In the re-issued patent, however, it is asserted that the "grooving and tongueing cutters at the same time, and by the same operation, reduce the board or plank to an exact width throughout." As in the patent of 1828, the reducing to a width was performed before the board was presented either to the planing or to the tongueing and grooving cutters, there was no need of reducing to a width a second time; and certainly there is in the patent of 1828 no mention of "revolving cutter wheels," in connexion with the operation of reducing boards to a width. The original patent of December, 1828, describes a reciprocating machine, such a machine as is represented in the drawing sworn to by William Woodworth, in 1838, about ten years after the said patent was granted. When a board had been planed, the carriage returned, of necessity, before a second board could be set upon it. There was no other means described or indicated for getting the board past the planing wheel, except in connexion with a carriage; but in the patent of 1825, it is said "horizontal friction rollers may be geared, and the pressure rollers placed above them, to feed the board with or without the carriages, a bed plate being used directly under the planing cylinder." Here are no less than three very important features introduced into the alleged invention of William Woodworth which do not appear in the first patent; first, dispensing altogether with the carriage; second, using geared friction and pressure rollers; and third, putting a bed plate directly under the planing cylinders, without any carriage intervening between it and the board, which was to pass over it. By these alterations introduced into the reissued patent, the machine from being reciprocating became continuous, the continuity of

action saving a large portion of the time of the machine and of the operator. The patent of 1828 showed no geared pressure rollers; the drawing shows guides in a cylindrical form, but without upper bearings, and the want of these is incompatible with their use as pressure rollers. These guides were set vertically, and were not connected with the carriage, but with the frame of the machine.

Another point in which I consider the patent of 1845 to differ from that of 1828 is, that in their reissued patent it is alleged that the board is to be made to advance towards the planing cutters in such a manner that, in making their cut, they should cut outwards, or from the plank towards the unplaned surface; while in the original patent no mention is made of the necessity of cutting in that direction rather than the other. On the contrary, the drawing sworn to by William Woodworth in 1838, and the other drawing lodged in the Patent office, as a drawing connected with the restored patent of William Woodworth, show the knives on the planing cylinder to be so set as to cut from the unplaned towards the planed surface.

The drawing as well as the specification of the reissued patent, represent the cutting of the planing wheel to be performed from within outwards, for the alleged purpose of preventing the drilling of the cutters, by coming in contact with the gritty surface of the board. Two of the claims in the reissued patent of 1845 are founded on the alleged necessity of keeping the board from being drawn towards the centre of the cutter wheel, in consequence of this cutting from within outwards; the purpose of the pressure rollers placed before the cutters of the planing cylinders is asserted to be, to prevent the drawing of the board away from the bench, and towards the cutters. In the patent of 1828, not only was no claim made to rest on this alleged tendency of the cutters in the planing wheel, but as the mode of planing from within outwards does not appear to have been the mode of operating, no provision was required to prevent the tendency which that mode of operating is asserted to involve.

When, as stated and described in 1828, the machine was to be employed in dressing stone, there could be no ground for the assertion, that cutting from without inwards would tend to dull the tools any more than cutting in the opposite direction. In fact, the cutting of granular materials, from the dressed towards the undressed surface, or by what is called the dip and lift cuts, might be found positively injurious to the materials in some cases.

In the reissued patent of 1845 I find claimed objects of invention different from those set forth as the invention of William Woodworth in the patent of 1828. New drawings are appended to the reissued patent, which appear to have been made accordant with the new specification.

Answer to the third interrogatory. I am acquainted with the description of a patent granted to Louis V. J. M. Roguin, in France, March 15, 1817, as contained in the 23d volume of the work entitled "Brevets d' Invention," page 207, and with that granted to Antoine

G. Roguin, March 30, 1818, of which the description immediately follows the former in the same volume.

I am also acquainted with the description of a patent granted in France to Leonore Thomas Manneville, 9th of March, 1825, and with the addition thereto, granted 28th of April, 1825.

I find that the Roguin patents, in common with Woodworth, describe rotary cutters for planing, tonguing, and grooving, and cutting mouldings on boards. The first patent, that of March 15, 1817, describes cutters of the burr form, set in or formed upon a suitable head, "manchen," or muff; and in his patent of March 30th, 1818, is figured and described precisely that kind of chisel cutters, and exactly the kind of support, or revolving nut,—"no-yeau,"—to which the cutters are attached, in all the so-called Woodworth planing machine of the present day. This mode of making a planing cutter wheel, or a tongueing, grooving, or moulding cutter head, is distinctly pointed out in the figures of page 28th, volume 23d, of the Brevets d'Invention. The knives are set obliquely to the radius of the revolving cutter wheel, in such a manner as to cut by a shaving action. They had suitable holes, through which passed screw bolts, to attach them to the nut, or, as Woodworth calls it, the "log," which in his patent of 1828, he says extends from one head to the other of his cylinders. Both Woodworth and Roguin use detachable cutters, "distinct from each other," set in a wheel, or revolving support, and acting to "cut the reverse form of the tool," whether tongue, groove, moulding, or plane surface. They both make their cutters to "take on and off as occasion may require," according to the mode which Bentham, in 1793, said he had "practised with particular advantage in the instance of the moulding cutter and the planing roller." In the Roguin patent of March 15, 1817, the planing, tongueing, and grooving were performed while the board was conveyed by a carriage to and under the cutters. The machine was therefore reciprocating. It had to return before the planing of a second board could be commenced. The same was the mode of action of the Woodworth machine of 1828.

In the Roguin patent, the cutting was done from without inward, as seen in the figure of the cutter on plate 28 of the Brevets d'Invention. In the Woodworth patent of 1828, as I have herein before stated, the same position of the cutters is represented in the old drawing, sworn to in 1838, as a true representation of William Woodworth's machine. In the Roguin machine, a guide strip, or bar, is placed across the board, just at the part where it is about to pass beneath the cutters. In the Woodworth patent of 1828, cylindrical vertical guides were placed on the same side of the board as the planing cylinder; they were without upper bearings, as clearly indicated by the old drawing herein before referred to.

In the Roguin patent of March, 1818, the board to be planed was laid on a suitable support, and a carriage conveying the cutting wheel was made to travel along from end to end of the board, planing as it went, and reducing the board to a uniform thickness, the weight of the

moveable carriage being made such as to keep it from rising in consequence of the action of the cutters. Two guide strips, or bars, one before and the other behind the cutting roller, were made to conform to the different thicknesses of stuff to be planed, and the bench on which the board rested was made adjustable to the different thicknesses to be given to the finished work. The Woodworth patent of 1828 had its carriage moveable to and from the cutter wheel, to correspond to the thickness of finished work. In the Manneville patent of March 9, 1825, I find tongueing and grooving machinery both described and figured, and planing machinery described, but not figured. In this patent, pressure rollers are described as placed before the cutting tools, to prevent the bending up of the board. These rollers are weighted to a greater or less degree, according to the exigency of the case. The Woodworth machine of 1845 uses pressure rollers before the cutters also, for the purpose of keeping down the board.

The operation of cutting to a width by circular saws is common to the Manneville machine and to the Woodworth machine. The board to be planed by Manneville was fed to the cutters by geared feed and pressure rollers, and the machine was consequently continuous. The so-called Woodworth machines of the present day are fed in the same manner.

Answer to the fourth interrogatory. The French patented machine Roguin of March 15, 1817, has rotating planes in combination with a bar, to direct the board beneath the cutters, conforming, in this respect, to the Woodworth machine of 1828. There is no distinct indication in the patent, of either Roguin or Woodworth of 1828, that the guide bar of the one, or the guide cylinders of the other, were self-adjusting. In the patent of 1818, Roguin has guides over the board both before and behind the cutting roller. Before all the cutting implements in the Manneville patent, pressure rollers are used, as already stated. His language is: "Pour remedier à ce que le planche puisse se presenter aux outils avec la moindre couobure, je me sers d' une pesée dont le poids posé, par une roulette sur la planche à l'endroit, ou elle va commencer à être entailée."

Answer to the fifth interrogatory. A mechanic skilled in planing machines, could, by the aid of the said French patents, without the exercise of invention, make a machine to reduce to a thickness, plane, tongue, and groove boards at one operation, performing all its operations by means of the same kinds or revolving cutter wheels, in combination with substantially the same means of feeding in the boards and keeping them to the carriage or bench, which are found in the Woodworth machines of the present day. It would, if not in form, be in all essential constituent parts, in its modes of applying the mechanical powers, and in the physical laws which would govern its mechanical actions, be essentially the same machine as that of Woodworth.

Answer to the sixth interrogatory. I am acquainted with the patent granted by the United States of America to Nicholas G. Norcross, on the 12th day of February, 1850. I have seen the specification, draw-

ing, and model, but I have not seen a working machine made according thereto. I have made a comparison between the Norcross machine and the reissued Woodworth machine, and find that the Woodworth machine passes the board above the bench, and places the planing cylinder above the board, and uses pressure rollers to keep the board to the bench. The cut of the Woodworth machine is made while the board either remains unbent or is curved, slightly away from the cutter wheel. The cutter wheel is fixed on the frame of the machine, and without power of adjusting itself to the varying thicknesses of the board. The pressure rollers to keep the board steady are, from their form, necessarily placed at some distance from the line of cut made by the knives, so that the timber which is being cut is, at every moment, distant more or less from any solid support, against which the cutting action of the knife can be applied. A practical inconvenience also results from the cutting above the board, that the chips or shavings are thrown in all directions over the planed surface of the board, and into every part of the apartment, to the no little annoyance of workmen, and to the great danger of setting fire to the establishment, when any fire is used in the apartment. Mr. Norcross availed himself of the mode, long since described by Bentham, of placing the axis of the cutter wheel below the level of the bench, and allowing its periphery to rise a short distance above it, through a suitable aperture, formed for that purpose; the difference of level between the top of the bench and the top of the wheel being equal to the thickness of timber cut away. The edge of the bench, sloped upward from below, so as to conform to the curvature of the cutter wheel, or nearly so, becomes an immovable support, against which the cutters operate with a shearing action to cut off, without the chance of tearing or splintering, just so much of the timber as, at the moment of the stroke, projects beyond the edge of the bench. The weight of the board conspires, with the form of the stroke, to keep the surface of the board in contact with the bench. In common with the second Roguin patent, Mr. Norcross has a cutter wheel which is not absolutely fixed to the frame of his machine; but while Roguin's cutter wheel, mounted in a separate frame, had a traversing motion from end to end of the board, Mr. Norcross gives to his separate frame only a vertical traversing movement, in suitable guides, whereby the wheel can ascend higher, or descend lower, to accommodate itself to the greater or less quantity of timber to be cut from the under side of the board. For the purpose of gauging that quantity, so as to leave the board of the right thickness, the frame which carries the cutter wheel has at top a cross-piece, called a "rest," between which and the top of the wheel the board is made to pass. This cross-piece is concave downwards, the purpose of which is to make it curve or bend the board immediately over the cutter wheel. The curvature of the board buckles the fibres slightly, but sufficiently to prevent splintering the timber and tearing out knots, by the action of the cutters. This rest may be set at different distances above the top of the cutter wheel. When in operation the board is forced under

and past the curved rest, which is thus made to repose its own weight, and to suspend that of the cutter wheel itself upon the board, bending it in an exterior tangent curve to the curve of the planing cylinder. By this curving downward, in combination of the use of a sloping edge of the bench, against which the cut is made, and which prevents knots from being torn out, the most knotty and imperfect lumber may be worked to far greater advantage than in the Woodworth machine.

Mr. Norcross uses a box, trunk, or spout below the bench, to convey away the shavings into a proper receptacle—a feature which his machine possesses in common with that small machine of Manneville which he says was enclosed in a cylinder eighteen inches in diameter, with a two-inch aperture on each side, to let the stuff enter and come out, and an opening at the bottom for the escape of the shavings. The structure of the common Woodworth machines precludes the employment of this device to get rid of the chips. The Norcross machine has the further advantage over the Woodworth of not leaving these prominent cross ridges, which so frequently deform the work of the latter machine. The exemption is due to the *part*, that Norcross makes his cut on the interior curvature of the bent board, instead of making it on the exterior curve, or even on a plane tangent to the periphery of the planing cylinder.

The advantages of the Norcross machine may be briefly stated to be: 1st, that it employs the inertia of a solid unyielding support, against which, to cut the softer timber, instead of cutting an elastic substance with no other support than a distant roller, which is itself more or less yielding.

2d. By the curvature of the board downwards, as well as by the close proximity of the bench to the edges of the revolving cutters, the danger of displacing or of loosening knots, or otherwise marring the planed surface, is obviated.

3d. The direction of curvature prevents the forming of cross ridges, to the same extent as when the board is not so curved.

4th. The Norcross machine, by dispensing with the pressure rollers, simplifies the construction.

5th. Its arrangement of parts is compatible with an easy and commodious discharge of the chips, whereby a great annoyance is avoided, and danger from fire materially diminished.

Answer to the seventh interrogatory. The Norcross machine keeps the board in place while planing, by the efficiency of the weight of the board, the impulse of the knives, the weight of the rest which curves the board, together with that of the cutting cylinder, and of the frame in which it runs; while the dip and lift cut in the Norcross machine is opposite in its influence on the steadiness of the board, to what it is in Woodworth's, the device whereby the board is at once curved to receive the cut, and by the same means loaded and held fast to the bench, dispenses with the pressure rollers to make room for parts which render other and more important service.

Answer to the eighth interrogatory. I do not find in the Norcross

machine any combination of rotating planes with pressure rollers, or with any analogous device, substantially like the Woodworth machine.

Answer to the ninth interrogatory. I find in the Norcross machine not one of the combinations described and claimed in the Woodworth patent of 1845.

Answer to the tenth interrogatory. In the Norcross machine the solid and immoveable bench beneath which the cutter wheel revolves, prevents the rotating planes from drawing the board out of its line of motion and on to the cutters. By curving the under surface of the bench to conform nearly to the upper periphery of the cutter wheel, the supporting bench leaves no room for the least bending of the board between the cutter and the bench. In the Woodworth machines, a pressure roller, necessarily more or less yielding, is the device employed for keeping the board in its line of motion, and the roller, from its structure, cannot apply its pressure near to the line of cut, otherwise it would be struck by the knives after leaving the board.

Answer to the eleventh interrogatory. In my answer to the sixth interrogatory I have already pointed out the difference in structure and mode of operation between the solid bench of Norcross and the yielding pressure roller of Woodworth. I have also given the reasons why a solid support, applied directly at the point of cutting, to cut an elastic substance upon, is greatly superior to a yielding roller, placed at a distance from that point for the same purpose. The timber is, by the bench, preserved from shakes, splintering, and the loosening of knots, and the cut is made clean, because each succeeding knife takes wholly away all the timber which it strikes, and does not leave a portion merely broomed up, or half detached, for the succeeding cutter to act, when, as upon bundles of elastic springs, liable to be still further broomed up and splintered. The pressure roller of Woodworth cannot be brought near enough to the cutting edges to obviate this difficulty.

Answer to the twelfth interrogatory. The combination of the moveable cylinder with the fixed bed B in the Norcross machine, is substantially different in structure and mode of operation from the combination of fixed cylinder with pressure rollers in the Woodworth machine. My reasons for this statement have been substantially given in the answers to the 7th, 10th, and 11th interrogatories.

Answers to cross interrogatories.

Answer to the first cross interrogatory. I have both testified and given affidavits in causes such as are referred to in this interrogatory, and have given my opinions on the subjects herein mentioned, probably some seven or eight times in all. All these have been within the last three years. I gave testimony twice orally at Baltimore, in the case in which one Isaac Brown was respondent; twice in writing, in a case in which Daniel Barnum was respondent; once in writing, in a case stated to be on trial in North Carolina, in which I do not remember the

names of the parties, but in which, if I am not in error, the question lay between the Woodworth and the Ira Gay machines; and once in a cause in which the respondent's name was Enos G. Allen, or some party said to employ his machine. This last was an affidavit made within the last three or four weeks.

Answer to the second cross interrogatory. I gave an affidavit at the time of issuing the Norcross patent, understood to be for the satisfaction of persons desirous of knowing the character and usefulness of the machine therein described, but not understood by me to be intended for publication. This was at the request of Mr. Norcross.

Answer to the third cross interrogatory. I have examined, as the original patent of William Woodworth, that patent itself on the original parchment in the Patent office. I noticed that it bore the broad seal of the United States, and had attached to it an assignment executed by William Woodworth to one James Strong, 13th September, 1828, for an invention, or some interest in an invention, of a planing machine. I affixed no mark of my own, it not being usual, I believe, to permit private individuals to put marks upon public records. I have seen it for the first time in the year 1848, but the exact time I cannot specify, and for the last time on the 29th of March, 1851.

Answer to the fourth cross interrogatory. I have examined, as the original drawing of the Woodworth patent, a drawing herein before mentioned in my examination in chief, as bearing an oath of William Woodworth, taken in 1838, and affirming that it truly represented the machine for which a patent had been granted to him in December, 1828. I never affixed any private mark to said drawing, but noticed that the name of Andrews, I think A. Andrews, was marked in one or two places upon it. I also noticed that the drawing had no letters of reference, and no legend or description of parts upon it.

Answer to the fifth cross interrogatory. I have no recollection of ever having seen any machine purporting to be the original machine of William Woodworth at work, or of a size to be usefully operated. I saw a model some time in the latter part of the year 1828, according to the best of my recollection. It was, according to my understanding at the time, made by or under the direction of William Woodworth, and not far from the time of taking out his patent. I placed no mark upon it, but have a distinct recollection that the planing wheel was set in a fixed position with its axis vertical; that it had a carriage on which the boards were set, and that said carriage was reciprocating, having rack and pinion work to move the carriage. That model was very nearly, if not exactly, accordant in the arrangement of all its working parts with the drawing referred to in my answer to the 4th cross interrogatory. I am, however, under the impression that the rack seen in the drawing, as attached to the carriage by a link, was in the model, placed at the back of the carriage, and that the pinion which moved it was connected with the main frame. I do not know who made the model.

Answer to the sixth cross interrogatory. In the drawings to which I have referred I find rotating planes employed in combination with cut-

ter wheels for tongueing and grooving boards at one operation, but I do not find them operating "as described" in the reissue. The planing wheel in the reissue is represented to cut from within outward, while in the certified drawing aforesaid it is represented as cutting from without inwards. I have no drawing which I can append to this deposition. I have already designated the drawing to which my testimony refers.

Answer to the seventh cross interrogatory. As I saw no working machine of William Woodworth's prior to 1829, I cannot say whether such machines, if such existed, contained any of the devices, the combination of which is claimed in the reissued patent of 1845. I know nothing of any model filed in the Patent office, if any such was filed, at or prior to the issue of said letters patent. As all the models in the Patent office are understood to have been consumed in 1836, and as I never saw any model of the so-called Woodworth machine there prior to that date, I can say nothing of any agreement of such model, if there was one in the Patent office; and as I never made a model of the machine claimed to have been invented by Woodworth, I have only had the means of verifying his invention as it stood prior to 1829, by the model which he himself exhibited, by the specification which he entered at the Patent office in 1828, and by the drawings which, ten years after, he declared, under the sanction of an oath, to be a true representation of the machine patented to him.

Answer to the eighth cross interrogatory. I am unable to find in the drawings to which I have referred the combinations of the reissued patent. I have no certain knowledge of any machine made by Woodworth prior to 1829, and do not know that any model now exists which I could identify as one which I had seen prior to that date. But notwithstanding the absence of some of these means of settling the question of identity between the invention claimed by William Woodworth in 1828 and that claimed for him by others in 1845, I think my judgment has been made up on grounds quite as reliable as those which were offered to the Patent office by the parties claiming the reissue.

Answer to the ninth cross interrogatory. It is one of the purposes of the alleged machine, in the original patent to William Woodworth, to reduce boards to an equal thickness, and as he set his boards on a carriage to convey them by the planing cutters, he doubtless had means of confining the board, or conceived of using some of the well known devices for steadying the board; indeed I do not suppose that any of the numerous planing machines invented prior to Woodworth's was without such devices. Experience must early have taught all of them that attempting to work on materials without holding them would be fruitless, if not absurd; but I do not hence infer that William Woodworth invented pressure rollers, or first applied them before rotary cutters, or any other mode of applying pressure, especially in the absence of all evidence to prove that he did so. Were I a draughtsman, and should I attempt to give a sketch of the manner in which boards could be held down to a carriage, I should only think it necessary to represent the very effective modes described by Manneville three years before.

Answer to the tenth cross interrogatory. I do find on the drawing to

which I have referred of the Woodworth machine of 1828, upright cylinders, represented on each side of the planing cylinder; but as I have already stated in my examination in chief, they have no upper bearings, and no indications that they had a self adjusting power. Without such power they would only have acted on boards sawed to a uniform thickness before planing, and such boards would have been left of a uniform thickness after planing.

It was not, according to the best of my knowledge and belief, until some other inventors, besides William Woodworth, had shown how adjustable pressure rollers could, by adapting their action to the varying thicknesses ("epaisseurs") of the planks, allow of planing those of variable thickness, that the machine did work successfully.

Answer to the eleventh cross interrogatory. I have not seen either the originals or authenticated copies of the French patents referred to in this interrogatory. I have read in the Brevets d'Invention, in the French language, which I understand, the descriptions of the patents herein mentioned, and have not depended on any translation for the knowledge I have of those patents. The Brevets d'Invention is a well known work published under authority of the French Government. It contains accounts of expired French patents. It has been many years in the course of publication. The 23d volume bears the date of 1832; the 41st volume is without date on the title page. I have no other knowledge of the dates of these patents than that derived from the work above mentioned, which I consider one of the highest authority.

Answer to the twelfth cross interrogatory. I am in possession of no other knowledge of the dates of the several volumes of the Brevets d' Invention, than is afforded by the several volumes of the work itself. It is now many years since I saw the earlier volumes, and the work is, I believe, still in the course of publication. I have conversed with persons born in France relative to the authority of this work, and to the reliance which might be placed upon it, and from this source have been led to believe that it could be relied upon.

Answer to the thirteenth cross interrogatory. In the Roguin patent I find planing, tongueing, and grooving cutters combined, with guide strips to keep the board steady; and in the patents of Manneville I find rotating tongueing saws, and a grooving cutter-head, in combination with pressure rollers. In the same patent I find planing cutters in combination with both feed rollers, with gearing and pressure rollers, to adapt themselves to the varying thicknesses of the boards.

Answer to the fourteenth cross interrogatory. The words of the first Roguin patent, describing the part referred to, are, "*x*, traverse en bois nommé le guide." This designates a part placed across the board in front of the cutter wheel.

In the second Roguin patent, the language describing the corresponding part is, "le guide representé dans la première machine, par la lettre *x*, est dans la nouvelle machine porte par le chariot," where, I may remark, that the part here termed "le chariot," is that carriage which moves with the cutter wheel, and in fact carries it from end to

end of the board. On this machine, as I have already stated in this deposition, there is a guide before as well as behind the cutting wheel, just as there was in the first Woodworth patent. In the first Roguin patent, but not in the second, the so-called burr cutter is figured. In the patent of 1818, the cutter wheel is constructed so identically like the Woodworth cutter wheels of the present day, that no essential distinction could be pointed out between them. There is, in the Roguin machine of 1817, no parts indicating that the curb, or "guide" *x*, either did or did not rise and fall, but, as the name implies, that it is in contact with something which restrains and directs. It is no more unreasonable to presume mobility in this case, than in the analogous one of the first Woodworth machine. As in the case of Roguin's first patent, the board was set on a carriage, and, as in all cases of that kind, had means of holding and carrying it forward, and was not dependent on the guides solely for its direction, the machine may, especially on boards of uniform thickness, have operated with a good degree of exactness. The two guide strips, one before and the other behind the cylinder, if at the same level, would tend to give a slightly inclined position to the cutter wheel frame, as the forward guide rested on the uncut timber, and the rear one did not, and this tilting would be more or less as the thickness required to be cut away should be greater or less.

The weight of the carriage is expressly stated to be made heavy enough to keep the carriage from being raised by the effect of the cutters. By suitable weights and proper means of sustaining the axle of the cutter wheel, at the same level above the supporting strips, on which the carriage traversed, there would be no such difficulty as leaving the plank of variable thickness.

Answer to the fifteenth cross interrogatory. I have described the manner in which the pressure is applied in combination with the several kinds of cutting implements employed in the Manneville machine. In the first patent, the tongueing and grooving was performed while the board rested on a carriage; both operations were executed at the same time, and the plank was kept from bending upwards by pressure rollers, suitably weighted. In the second patent, the reciprocating carriage is wholly dispensed with, and the pressure rollers retained. The roller is pressed down upon the board by a lever and a weight, moveable along said lever to increase or diminish the pressure at the will of the operator. This mode is practicable, and is often practised in modern planing and other machines.

The tongue is cut by Manneville, by means of four circular saws, the groove by two circular saws, and a sliding plough-plane, or by a cutter head, furnished with distinct cutting tools, substantially like the cutter heads for the same purpose which other inventors had previously applied.

In so far as the tongueing and grooving operations of Woodworth require the combination of pressure rollers to steady the board, under the action of the cutters, the Manneville cutters equally required them;

and in this respect, which is the true ground for the combination, the two machines are substantially similar.

Answer to the sixteenth cross interrogatory. The pressure roller would have the same power to prevent the board from deviating from its track, laterally, in the application made by Manneville, as in that made by Woodworth. In the case of being set on a carriage, it would less require the efficacy of the pressure rollers to prevent lateral deviation than when carried forward, as in the additional Manneville patent, where the reciprocating carriage was dispensed with, and a continuous action of the machine was substituted.

Answer to the seventeenth cross interrogatory. I understand that in the part of Manneville's description, referred to in this interrogatory, he is not giving a specific account of the parts enclosed, but merely indicating that any other convenient combination of weighted levers, besides the one he has figured, might equally answer the purpose; and that so compact might the whole be rendered, that all the working parts could be enclosed in a cylindrical box 18 inches in diameter. The substituting one set or combination of levers for another, requiring no invention, he has not thought necessary to do more than indicate one of the advantages which such a substitution might give in procuring greater compactness, enabling him to enclose the parts in a box, out of sight, and with a hole or spout below, like that of Mr. Norcross, for receiving all the chips and cuttings of the timber.

Answer to the eighteenth cross interrogatory. I am compelled to say that this interrogatory seems to me to have been framed under an entire misconception of the machinery to which it relates, and gives an altogether erroneous suggestion, tending to convict the inventor of making either an unintelligible description or an incongruous machine; whereas he has, in truth, in this part, at least, given a most lucid and explicit description of a most efficient mechanical arrangement. The longitudinally creased or grooved rollers ("cylindres cannales") set vertically, are declared to be made self-adjusting, to correspond to the different thicknesses, not to the different breadths of the boards. The bearings or boxes of these rollers ("les fontaines")—of one of the rollers, are said to slide in grooves, ("les coulisses,") and the two rollers are said to be thus made to adjust themselves to the variation in the thicknesses ("les epaisseurs") of the pieces to be planed. Weights or springs are applied to maintain a steady pressure of the rollers against the two faces of the plank, which is expressly said to be set on edge ("à champ") upon friction rollers, of which the axis are horizontal. From this statement it is apparent that the mechanical incongruity, not to say absurdity, of making pressure rollers, designed to correspond to, and allow for the varying thicknesses of a board, apply their pressure against its edges, instead of its flat sides, has not entered into the conception of M. Manneville. No such incongruity is to be found in his description. According to that description, the planing operation was like that represented to be done in the drawings of the Woodworth machine of 1828, performed on a board set edgewise. But Manneville

moved his board forward, not on a reciprocating carriage, as did Woodworth, but by the much more advantageous method of geared pressure and feed rollers, giving thereby a continuous action to the machine while it held the board against the bench, and in both these respects anticipating by some years the most advantageous feature, known to have been possessed by the machine of Uri Emmons, and subsequently incorporated into the reissued patent under the name of Woodworth, in 1845.

Answer to the nineteenth cross interrogatory. The description of the planing operation is not so definitely given as to show that the inventor, Manneville, intended to claim any specific kind of planing tools. He evidently did not intend to confine himself either to rotating or to reciprocating planes, since he mentions placing in a rotary tool carrier ("porte-outils") either cutting tools or burs, ("ou des tranchants ou desfaises.") The tool carrier he denotes by the letters *e*, *h*, of the drawing. He has also shown how the board may be reduced and planed by two reciprocating planes, one of which cuts away the surplus timber, and the other barely smooths the surface which comes against it, ("qui viens le chercher.")

The description will admit of placing one plane on one side of the board, and the other on the other, so that the side which comes next to the bench may be barely smoothed as it passes over the plane, and the other side reduced and planed so as to leave the board of the requisite thickness. Or the planes admit of being placed one before the other, so that the front one may take away the surplus timber down to a certain thickness, and the other, acting the part of a smoothing plane, come after and finishes the surface.

Answer to the twentieth cross interrogatory. There is no drawing connected with the description of the planing machinery of Manneville, but in the preceding answer I have stated that both kinds of planing cutters are referred to, and in every case there will be pressure rollers acting in combination with the planing cutters, whether they be rotating or reciprocating.

Answer to the twenty-first cross interrogatory. The addition of Manneville does not apply solely to feeding and moving plank by means of endless chains; it applies also to the subject of planing tools, as stated in my preceding reply. And in the part where it does refer to the use of an endless chain, it is not in connexion with the planing machine at all, and it does not involve the action of the cutting tools in any such difficulty as the interrogatory supposes; the chain refers to the tongueing and grooving machinery. This question seems, like the 18th, to have grown out of a palpable misconception of Manneville's true meaning.

Answer to the twenty-second cross interrogatory. A mechanic skilled in planing machines would, by the aid of the French patents, and such knowledge as his skill in such machines would imply, find no difficulty in constructing out of either a machine in all essential particulars equivalent to the Woodworth machine. Such a machine would

not be likely to take the crude form of the old Woodworth cutter wheel with circular heads at the ends of the cylinder, and a set of flat shaves or draw knives reaching from head to head; but, in common with Roguin's, it would have its knives attached to a central nut, and each knife sloping away from the radius of the wheel, exactly as the Woodworth cutters are now made. Such machine might have its board set on a carriage, but as that primitive mode of operating would be liable to decided objections, on account of the waste of time and labor it would involve, the mechanic skilled in planing machines would avail himself of the more useful device of Manneville, apply feed rollers across the breadth of the board, give play to journals of one of said rollers, to allow for the different thicknesses of the boards, apply pressure to the moveable journals, then gear the heads of these rollers, and connect them with his mechanical mover, and send the boards in continuous succession under the action of the cutters. If the pressure applied at any moment to the pressure rollers were found insufficient for the purpose, he would need no invention to enable him to add more weight, or carry that already in use farther out on the lever, or to substitute a stronger spring for the one already in use. Being skilled in planing machines, he would know in advance how to construct cutters to put on and take off, and applicable to cutter wheels of all sorts, whether for tongueing, grooving and moulding, or for planing. This he would have learned from the clear descriptions of the French patents, though he would not, in fact, need to be told at that late day, (1825,) much less in 1828, that cutters, to form the reverse of their own figure on any long piece of timber, could be applied as well on two or three sides at a time as on one; that this constituted no "new method of cutters," as he must have known that instructions for doing it, the most exact and explicit, had been given in the last century, and had already been for many years common property to all the world. Whether like Bentham and Roguin he would plane his board resting on its flat side, or like Manneville set it on its edge, would be a mere matter of indifference, except as to the details of manipulation. As he would have known that cutter wheels with horizontal axles had, in planing machines, been placed above a bench, and below it, that materials had been fed to the revolving cutters, so as either to meet their motion or to go along with it, to cut from within outwards, or from without inwards, he would adopt without invention either arrangement, in each of these respects, according as the nature or condition of the material operated on *or* might seem to require. If he would dress boards covered with grit, he would be likely to make his arrangements to cut into the clean wood first, and finish his cut with the dirty surface; but if he used his machine to cut only clean stuff, or applied it to stones and other granular substances, he would direct the stroke of the cutter outward or inward, as best suited the physical constitution of the particular substances to be dressed.

In slitting up hard substances into breadths, he would be most likely to use friction wheels, precisely the same implements that have been

moved his board forward, not on a reciprocating carriage, as did Woodworth, but by the much more advantageous method of geared pressure and feed rollers, giving thereby a continuous action to the machine while it held the board against the bench, and in both these respects anticipating by some years the most advantageous feature, known to have been possessed by the machine of Uri Emmons, and subsequently incorporated into the reissued patent under the name of Woodworth, in 1845.

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In slitting up hard substances into breadths, he would be most likely to use friction wheels, precisely the same implements that have been

in use among glass cutters and lapidaries for the same purpose for centuries.

Answer to the twenty-third cross interrogatory. In the Norcross machine, it is the side that is being planed that is held firmly against a bench, so as to receive the cut in the most effective manner, while the rest applied to the opposite or uncut side, not for a single purpose, as in the interrogatory, but for the triple purpose of gauging the thickness, bending the board so as to curve over the cylinder, and to retain the face to be cut in perfect contact with that surface towards which the cutter gives its cutting stroke.

Answer to the twenty-fourth cross interrogatory. In the Woodworth machine, the board on the unplaned side presses the bench, or is pressed to it, for the single purpose of avoiding vibration; the Woodworth machine, therefore, with its array of pressure rollers, produces but one of the effects which the Norcross machine accomplishes, and that one in a far less perfect manner.

Answer to the twenty-fifth cross interrogatory. In both these machines there are doubtless such features common to them, and to all the prior planing machines, as are referred to in the interrogatory.

Answer to the twenty-sixth cross interrogatory. In the Woodworth machine there is a want of equal thickness; the wavy cross ridges, with cavities between them, give in fact an infinite number of varying thicknesses to the finished work, which any one may see who looks at a floor laid with Woodworth boards, until the hand plane has removed that defect. The Norcross machine is constructed and operated in a manner to obviate this very defect, to a greater or less extent.

Answer to the twenty-seventh cross interrogatory. The substantial difference in the process is, that the Norcross machine makes a clean cut; the Woodworth machine, a jagged and broomy one; the Norcross makes a smooth surface, over knots and tender places in the board; the Woodworth is liable to tear out the knots, and crack or splinter up any weak or defective portions of the timber; the Norcross cuts within a concavity, and as the board advances over the cutters the action approximates remotely that of boring out a cylinder, giving, where the curvative is taken out, a plain surface. The Woodworth cuts either on a plain surface or a reversed curve, a set of cross ridges, like those on an elephant's tooth, or a set of low protuberances, like flattened rack teeth, extending across the board.

Answer to the twenty-eighth cross interrogatory. Not being informed in which of its numerous services the word "principle" is used in this interrogatory, I must decline an attempt to divine its meaning.

Answer to the twenty-ninth cross interrogatory. I have in substance answered, in my reply to the 27th cross interrogatory, the first part of the 29th, and as to the other part, I have to say, that like the 28th, it is too indefinite to enable me to make any reply.

Answer to the thirtieth cross interrogatory. I think no mechanical devices would ever produce a machine that would plane boards, when no boards were supplied to it; and I think the second part of the ques-

tion fully as deserving of a serious answer as the first. No board is ever planed without something to rest upon.

Answer to the thirty-first cross interrogatory. The Norcross machine, from the very structure, wants no special device to prevent the board from being drawn towards the axis of the cutters. It planes and reduces to a thickness, by devices, long since known to every one skilled in planing machines, and wants no others. The other members of this series of inquiries seem to me but a set of abstractions, which I am not sure that I can apprehend, and cannot therefore offer a reply.

Answer to the thirty-second cross interrogatory. I believe I have not undertaken to discuss any relation of the two machines, now under consideration, to the abstract expressions made use of in this interrogatory, much less have I undertaken to affix definitions to those abstract terms, on which so much profitless labor has been expended.

Answer to the thirty-third cross interrogatory. My means of acquiring a knowledge of practical science, and its application to the useful arts, has extended over a period of more than forty years, and the examination of machines and inventions, with a view to ascertain their novelty and usefulness, has been at least half of that time; I have probably, within the last fifteen years, been some twelve or fifteen times called upon to testify on subjects referred to in this interrogatory.

Answer to the thirty-fourth cross interrogatory. Of the four or five different machines which have been the subjects of discussion in the several trials in which I have been called upon to give testimony, I do not recollect that I have found one which I regarded as an infringement on the Woodworth patent.

Answer to the thirty-fifth cross interrogatory. For reasons assigned in my answer to the 28th cross interrogatory, I am unable to give the information asked for in this.

Answer to the thirty-sixth cross interrogatory. The mode of operation of the machine described in the present Woodworth patent is to plane, tongue, and groove boards by rotating cutter wheels, operating in a manner long known among mechanics for using the same implements, and holding and feeding the boards, so as to pass by the cutters, by means and devices equally well known, for that and similar purposes, for years before William Woodworth obtained his first patent.

Answer to the thirty-seventh cross interrogatory. It seldom happens that inventing a machine does not, in some respect, change the application to it of those physical laws which regulate its mechanical action and efficiency, and such change or inversion may sometimes be in the highest degree beneficial, while in others it may be, if not physically impossible, at least practically absurd. If any new and useful effect, not produced or producible by the rollers, be introduced in the mode of action of the machine, by the yielding bars, mentioned in the latter part of this interrogatory, then the mode of operation would be essentially changed, otherwise not.

Answer to the thirty-eighth cross interrogatory. To make the inversion in the mode of action of the Woodworth machine, described in

this interrogatory, would, so far from being beneficial, simply imply fatuity, such as is expressed in the familiar phrase of putting the cart before the horse.

Answer to the thirty-ninth cross interrogatory. The Woodworth machine, charged as suggested in the last interrogatory, would only render the gravity of parts of the machine, including the cylinder and the bed, as well as that of the board, encumbrances to the machine, demanding a vast increase of the pressure weights to counterpoise them; while the Norcross machine dispenses with separate pressure weights, as well as with the rollers, makes the gravity of parts of the planing cylinder, frame, and rest, not only to conspire with the weight of the board to press the surface against the bench, as I have before explained, but also enables the board to be curved over the cylinder, and the cutting to be performed within a concave surface, a mode of operation unknown to the Woodworth Machine. The suggested alteration of Woodworth's machine would in no respect employ the mechanical powers to greater advantage than the present, and would continue the nuisance of scattering chips and dust over the establishment. The Norcross machine, while obviating this nuisance, employs the gravity of the cylinder, to produce the new and useful effect of bending the board, while its cutting action is made more efficient in consequence of its arrangement with reference to the bench.

Answer to the fortieth cross interrogatory. I am not engaged as counsellor or attorney for the defendants, or either of them, or for any other party using or owning planing machines, for causes present or future, and of course I have no compensation contingent on the success or defeat of the Woodworth patent; and I may be permitted to add, that I have never had any compensation dependent on such contingency.

Answer to the forty-first cross interrogatory. I have not been employed as counsel or adviser of Nicholas G. Norcross on any question of improvement between the Norcross machine and the Woodworth machine, except in the examination and comparison made of his invention, at the time it was patented, more than a year ago. No contingent compensation was connected with that service.

WALTER R. JOHNSON.

DISTRICT OF COLUMBIA,
Washington county, ss.

In compliance with the foregoing commission, I appointed Tuesday, the 1st day of April, 1851, for the examination of Walter R. Johnson and J. J. Greenough, touching the premises in said commission mentioned, at which time the said deponents appeared before me, and, being duly sworn, the examination was commenced and continued from day to day until the fourth day of said April, on which day the said Greenough subscribed the testimony by him given, and by him reduced to writing in my presence; and on the 5th day of said April the said Johnson having completed his testimony, and reduced the same

to writing in my presence, subscribed the same. All which was done in strict conformity with the terms of said commission.

And I do hereby return the said commission, with the testimony of said deponents annexed thereto, to the circuit court of the United States, within and for the district of Massachusetts, to be holden at Boston; said testimony to be used in a certain cause pending in said court, wherein Artemas L. Brooks et als. are complainants versus John Fiske et al., respondents.

Sealed up by me on this 5th day of April, 1851.

B. B. FRENCH, *Commissioner.*

UNITED STATES OF AMERICA,
Massachusetts district, ss.

[L. S.] The circuit court of the United States, within and for Massachusetts district.

To William Dodge, esquire, counsellor at law; or George R. J. Bowden, esquire, counsellor at law; or Charles A. Peabody, esquire, counsellor at law; or William Channing Russell, esquire, counsellor at law, all of New York city.

Know ye, that reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed, of Thomas W. Harvey, Thomas B. Stillman, John Ericsson, Henry R. Dunham, Oliver Byrne, Henry R. Worthington, Thomas W. Wood, Samuel J. Cornell, and John Pendleton, all of the city of New York, witnesses to be examined on behalf of the respondents, and to be used in a certain cause now pending in said court, wherein Artemas L. Brooks et al., complainants, versus John Fiske et al., respondents.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses as aforesaid to be brought before you, and each witness, while present before you, to examine carefully on oath touching the premises. And when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence. And the same, so taken and subscribed, to return, together with this commission and your doings herein enclosed, sealed and directed to the circuit court aforesaid, to be holden at Boston, as soon as the same shall have been executed.

In testimony whereof we have caused the seal of the said circuit court to be hereunto affixed.

Witness the honorable Roger B. Taney, at Boston, this fifteenth day of March, in the year of our Lord one thousand eight hundred and fifty-one.

ISAAC O. BARNES,
Clerk of the circuit court of the United States,
Massachusetts district.

N. B. You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the depositions, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the deponents whilst giving their depositions in answer to the interrogatories annexed to this commission. And you shall take such depositions in a place separate and apart from all other persons, and permit no person to be present during such examination, except the deponents and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the depositions to writing. And you shall put the several interrogatories and cross interrogatories to the deponents in their order, and take the answer of the deponents to each, fully and clearly.

Circuit court of the United States, Massachusetts district.

BROOKS and others } vs. FISKE and another. } In equity.

Interrogatories to be proposed to Thomas W. Harvey, Thomas B. Stillman, John Ericsson, Henry R. Dunham, Oliver Byrne, Henry R. Worthington, Thomas W. Wood, Samuel J. Cornell, and John Pendleton, of the city, county, and State of New York, witnesses to be examined in behalf of the defendants.

1. State your age, residence, and occupation, and how long you have been engaged in your occupation, and whether you have been accustomed to examine and compare machines and patents, with a view to their novelty and identity; and whether you have been frequently, or how otherwise, examined in patent cases as an expert.

2. Are you acquainted with the patent, and its specifications and drawings, granted by the United States of America to William Woodworth, on the twenty-seventh day of December, A. D. 1828, for an improved planing machine, and with the reissued patent aforesaid, granted to William W. Woodworth, administrator of the said William Woodworth, with an amended specification, on the eighth day of July, A. D. 1845? If yea, state whether the said reissued patent describes the same invention as the said original patent, or how otherwise. Is the new patent for the same invention as the old one? State your opinion, and the reasons for the same, fully and at large.

3. Are you acquainted with the patent granted in France, March 15, 1817, with an addition, March 30, 1818, to Messrs. Roguin, for a planing machine; and a patent granted in France, March 9, 1825, with an addition, April 28, 1825, to M. Manneville, for machines for grooving, planing, and reducing to an even thickness, boards, &c.; or with the description of said patents and machines, published in the French work called Brevets d' Inventions, vol. 23, pages 207 to 212, plates 27 and 28, and vol. 41, pages 111 to 116, plate 12? If yea, state whether the same contain, or describe any, and what part, of the

invention described or set forth in the said Woodworth patent, granted the twenty-seventh day of December, A. D. 1828, or reissued July 8, 1845. State, particularly, what material parts and combinations, if any, are substantially the same in the said French machines and the said Woodworth machine. How do said machines compare in the mode of operation?

4. Have said French machines, or any of them, rotating planes, in combination with rollers, or any analogous device, to keep the board in place, substantially like the Woodworth machine, or how otherwise?

5. Could a mechanic, skilled in planing machines, by the aid of said French patents, make the Woodworth machine, or any, and what, part thereof, without invention?

6. Are you acquainted with the patent granted by the United States of America to Nicholas G. Norcross, one of the defendants, on the twelfth day of February, A. D. 1850, for an improved planing machine, or any model or machine made according thereto; and are you acquainted with the said reissued Woodworth patent, or any model or machine made according thereto? If yea, state whether the said Norcross machine is substantially different in structure, principle, or mode of operation, from the said Woodworth machine, or how otherwise? Compare said machines together, and point out the differences in the Norcross machine from the Woodworth machine, and the advantage or beneficial effect of such differences, if any there be?

7. What device has the Norcross machine for keeping the board in place while planing? State whether the same be, or be not, substantially different in structure and mode of operation from the rollers in the Woodworth machine for the same purpose?

8. Has the Norcross machine any combination of rotating planes with rollers, or any analogous device, substantially like the Woodworth machine?

9. Has the Norcross machine either of the combinations described and claimed in the Woodworth patent of 1845?

10. What prevents the rotating planes from drawing the board out of its line of motion, and on to the cutters in the two machines?

11. State whether there be a substantial difference in structure and mode of operation between the solid bench, against which the rotating planes cut, in the Norcross machine, and the pressure rollers in the Woodworth machine; and state which is the best, the bench or the roller, for cutting against, and give the reasons for your opinion.

12. State whether or not the combination of the moveable cylinder with the fixed bed B in the Norcross machine, is substantially different in structure and mode of operation from the combination of the fixed cylinder with pressure roller in the Woodworth machine, and give the reasons for your opinion.

A true copy.

Attest: ISAAC O. BARNES,
Clerk.

The cross interrogatories propounded by the plaintiffs to certain experts, witnesses for the defendants, to wit, Thomas W. Harvey, Thomas B. Stillman, John Ericsson, Henry R. Dunham, Oliver Byrne, Henry W. Wood, Samuel J. Cornell, and John Pendleton, of the city, county, and State of New York.

1. Have you ever, before this, testified or given affidavits in any cause in court, or in connexion with any application for legal proceedings under the Patent law before any person, court, or officer, in which affidavits or testimony you have given your opinions, or any questions of originality or novelty, or of infringement, in connexion with the Woodworth patent? If you have, state how many times you have so testified, at what dates, and whether orally or in writing.

2. Have you ever given any affidavits on such subjects as above inquired of, which were to be used ex parte for publication, or otherwise; if so, how many, and to whom, and at what dates, as near as you can fix them? State also the purpose for which you understood your testimony to have been taken in each and every one of the above instances, and at whose request you testified.

3. State what document you have examined as the original patent and specification, granted to William Woodworth; when you first, and when you last, so examined it, and what mark or means of recognising the identity of the instrument so examined, you affixed.

4. State what document or draught you have examined as the original drawings of the specification and patent, granted to Wm. Woodworth, or as a copy of the same; when you first, and when you last, so examined it; what mark or means of recognising the identity of the drawings so examined, you affixed.

5. State whether you have formed your opinion, in whole or in part, respecting the original patent, granted to William Woodworth, from any model of the original, or from having seen said original machine, or any of them; if from a model, was it made at or before the granting of said letters patent or since then, and by whom was it made, and what mark or means of identifying said model have you affixed thereto?

6. State whether or not any, and if any, which of the devices, the combination of which is claimed in the reissued letters patent, are to be found in said drawings; please to be particular in your description, and append a copy of said original drawings, or so mark and designate the drawings from which you testify that they may be identified.

7. State whether or not any, and if any, which of the devices, the combination of which is claimed in the reissued letters patent, were to be found in any of the original machines of said Woodworth which you saw before the year eighteen hundred and twenty-nine; whether or not, and if any, which of the devices, the combination of which is claimed in the reissued patent, were to be formed in the model of the machine by said Woodworth, filed in the Patent office at or prior to the issue of said letters patent, or which you may have made from the ori-

ginal machines by said Woodworth, set in use prior to eighteen hundred and twenty-nine, or which you may have compared with and known to be an exact description of said original machines.

8. State whether or not any, or if any, which of the devices, the combination of which is claimed in the said reissued letters patent, you are unable to find either in the drawings, the authentic model, or the original machines used by said Woodworth prior to the granting of said original letters patent; and if you answer that all these means of making the comparison are not within your knowledge and command, say how much credit and value you, as an experienced expert, think ought to be attached to opinions on the reissue, made up without the knowledge or examination of the identical machine, or of all these evidences of the machine, on which the letters patent were originally granted.

9. Is not one of the purposes stated in the original patent of Woodworth to reduce an equal thickness, and, if yea, can you point out any practical mode of reducing plank to an equal thickness by means of rotating planes, without pressure rollers, or their equivalents, for making pressure on that face of the plank which is being planed? And if you can point out any such mode, do so clearly and fully, and if you can, accompany such description with a drawing or drawings.

10. Do you not find in the drawings of the Woodworth patent of 1828 the representation of rollers on each side of the planing cylinder, and on that face of the plank to be planed; and, if yea, could the machine have worked successfully on planks of varying thickness, unless the said rollers had been made self-adapting to the varying thickness of the plank? Give your reasons fully for any opinion you may express on this subject.

11. If, in answer to the third direct interrogatory, you shall have stated that you have read the descriptions, and examined the drawings, of patents granted in France on the 17th of March, 1817, and 30th March, 1818, to Messrs. Roguin, and also on the 9th March, 1825, with additions on the 28th April, 1825, to Mr. Manneville, state whether you have seen the original patents granted in France, or authenticated copies thereof granted by the Government of France, or whether they were copies purporting to have been extracted from a certain French work, entitled "Brevets d'Invention," and if the latter, or translations thereof, please state if you have examined the said work, and give the date of its publication; state whether you read the French language, and whether in testifying as to these French inventions you have relied on your own knowledge of the French language and the examination of the said work, or on the translations? Have you any knowledge other than the publication of the work referred to, of the dates of the said patents, and if so, what?

12. What knowledge have you of the year when said printed work, referred to in the third direct interrogatory, was published? State fully, and give the sources whence you derive this knowledge.

13. If you shall have stated that you find in the French patents of

Roguin and Manneville substantially the same combination as in the Woodworth patent of July 8, 1845, state particularly whether you find said combination in any one, and which one, of the said patents, or whether to find the said combination, you would have to refer to all, or how many, and which of them.

14. If, in answer to the fourth interrogatory in chief, you shall have stated, that you find in the French patents to Roguin of March 15, 1817, and March 30, 1818, the combination of rotating planes with rollers, or any analogous device to keep the board in place, substantially like Woodworth's, give in your answer the words of the said French patents, which describe such combination, and the letters on the drawings which designate the parts constituting such combination. Do you, or not, find in the said French patent of March 15, 1817, that the plank is to be held to and secured on to the carriage by dogs or clamps? Is not the cylinder or rotating instrument for reducing the face of the plank formed with cutting edges, cut out of a solid block of metal, and resembling what is known among mechanics as the burr-cutter, in contradistinction from planes for shaving wood, and if you find these otherwise, state fully why, and in what particular, they are otherwise. Besides the cutters, do you find in this French patent of 1817 anything described or represented as passing or lying over the surface of the plank to be planed, other than a cross piece marked with the letter x, called a guide; and if so, please state whether you find, either described or represented, any mode by which the said cross piece or guide is either pressed down upon the surface of the plank or made to yield to any varying thickness of the plank? Do you find any such cross piece or guide stationary or yielding on both sides of the rotating cutters, and if only on one side could a machine for planing answer a good practical purpose with only one? If, in the patent of March 30, 1818, you find rotating planes, do you find these combined with a pressure roller, or its equivalent, and if so, point out the letters by which it is designated in the drawings. If, instead of a roller you find a cross piece or guide, as in the patent of 1817, please state whether you find, either from the description or drawing, that this said cross piece or guide is made self-adjusting to the varying thickness of the plank, and if so, point out the same in the description and drawings. Is not the said cross piece or guide represented as permanently attached to the same carriage with the planing cylinder, which carriage moves on the frame from end to end of the plank that rests on the main frame, and is it not stated in the said specification that the carriage, which carries the planing cylinder and guide, is to weigh about 200 pounds? If yea, could, in your opinion, a practical working machine be made on this plan? Would such a weight be sufficient to hold down the planing cylinder? The planing cylinder and guide being connected together in the same moveable carriage, would not the two, if they yielded at all, yield together, and thus plane the plank to a varying instead of an equal thickness?

15. If, in answer to the fourth interrogatory in chief you shall have

stated that in the French patent of Manneville, granted March 9, 1825, and the additions thereto, granted April 28, 1825, you find the combination of a planing cylinder with pressure rollers or their equivalents, point out the parts of the description and drawings relating to such combination. Is it not stated in said Manneville's first patent, that the plank to be tongued and grooved is to be securely adjusted on a carriage; and if you shall have stated that you find in the said patent a pressure roller, is not such roller to be used in connexion with some plan of securing the plank to the carriage? Specify particularly in what manner this roller is to be applied, and whether, in your opinion, such mode of application is practicable, and if so, why it is practicable. In your opinion could a machine be made practically useful with only one such pressure roller, unless in connexion with it some plan was adopted for securing the plank to the carriage? Is the mode of tongueing and grooving plank in said patent, by means of one cutter wheel on each side, or by means of circular saws, five saws being used for the tongue and three for the groove, together with reciprocating cutters for finishing the groove? If, in your opinion, this mode of tongueing and grooving planks is substantially similar to Woodworth's plan, give your reasons fully for such opinion.

16. In your opinion would the mode of applying the roller, described in said Manneville's patent, prevent the plank from moving laterally whilst being tongued and grooved; and if yea, point out what is described or represented for preventing the lateral vibration of the plank.

17. Can you understand every part of the description of the said Manneville's patent; and if so, describe the mode of construction referred to in that part of said patent in which he states that he has enclosed the entire mechanism in a cylinder of 18 inches.

18. In the description in said patent of the mode of planing planks, are the fluted pressure and feed rollers applied to the faces or edges of the plank, and if the latter, is it not stated that the plank is to be placed on rollers that have their axis horizontally, and that the two fluted rollers are vertical and parallel; such being the position of the parts, are or are not the fluted rollers applied to the edges of the plank?

19. Do you understand the construction and mode of operation of the planes for planing the surface or surfaces of the plank described in said Manneville's patent; and if yea, describe the same minutely, and if you can, accompany your description with a drawing or drawings, and do this without the exercise of any knowledge of planing machines derived from other resources.

20. Do you find in the said patents of Manneville, or either of them, the combination of rotating planes with pressure rollers for planing planks and reducing them to an equal thickness; and if yea, point out the said combination in the description; is there any drawing of the planing machine described in the said Manneville's patents?

21. Does or not the addition of the said Manneville, bearing date the 28th of April, 1825, apply solely to a mode of feeding or moving

the plank by means of an endless chain of links, to which the planks are secured by dogs and bolts, and to a modification of the roller for taking the warps out of the planks; do or not the dogs or bolts, or either of them, for securing the planks to the links of the chain, project above the surface of the plank; is not the roller grooved for the purpose of admitting of the passage of such projecting bolts; and if yea, how could such mode be applied when planing the surface of the plank, without destroying the cutting edges of the planes?

22. If, in answer to the fifth interrogatory in chief, you shall have stated that a mechanic, skilled in planing machines, could without invention construct the Woodworth machine, please state from which of the said French patents, and whether, in your opinion, this could be done by a mechanic having no more skill or knowledge of planing than was known at the time the said inventions purport to have been made.

23. Whether or not in the Norcross machine, when the plank is being planed and reduced by the action of the cutters on one of its sides, the other side is held firmly against a plate, bed, or rest, to prevent vibration taking place whilst under the action of the knife, and to secure the reduction of the board to an equal thickness.

24. Whether or not in the Woodworth machine, when the plank is being planed and reduced on one side by the action of the cutters, the other side of the plank is held firmly against a solid bed or rest to prevent vibration taking place whilst under the action of the knife, and to secure the reduction of the board to an equal thickness.

25. Whether or not, both in the Woodworth and in the Norcross machines, there are rotary cutters to place the board, and some mode of keeping the plank in contact with the rest, to reduce it to an equal thickness.

26. Whether or not, in each machine, the board is by the rotary cutters reduced to an equal thickness at the same time that it is planed; and if not, how otherwise?

27. What substantial difference, in the process by which the board is planed and reduced to an equal thickness, exists in the two machines?

28. What substantial difference, if any, exists in the result of the two machines, and whether that difference, if any, is a change in principle, and if so, of what principle of the Woodworth machine, and how is that principle changed?

29. State whether or not the mechanical devices in the Norcross machine effect any new and useful change in the operation of planing boards; if so, what is the new principle that is by said Norcross machine introduced into the art of planing boards which was before unknown?

30–31. Whether the mechanical devices in the Norcross machine supersede the necessity of feeding the boards to the cutter; of holding the board firm against a bed or rest whilst its opposite side is being planed; of preventing the board from being drawn towards the axis of

the cutters by the operation of planing; of planing and reducing to an equal thickness by the same operation; of arranging the machines to admit boards of varying thickness to be fed to the cutter; of adjusting the periphery of the cutter at a fixed distanced from the bed or rest, which is on the opposite side of the plank or board, to determine the exact thickness that shall be left after being planed; of having the surfaces, between which the plank passes, vary in their distance from each other to accommodate the varying thickness of the plank, whilst the cutting cylinder and the rest opposite to it remain at the same distance apart; of having this varying distance of surfaces self-adapting by pressure, to keep one face of the plank against the rest.

32. If you have answered at any time to any questions respecting the principles of the plaintiff's or defendant's machines, please state carefully what definition you attach to the term "principle" of a machine, and whether you understand the use of analogous devices or mechanical equivalents in a machine to change the principles of such machine.

33. What have been your means of acquiring an expert knowledge of mechanics, and how much time have you spent in acquiring such knowledge; how long have you been an expert, and how often have you before testified as an expert; how many years were you a practical mechanic, and in what branch of mechanics were you practically engaged?

34. Have you ever examined any machine which you regarded as an infringement on the Woodworth patent?

35. What do you regard as the principles embodied in the machine described in the present Woodworth patent?

36. What do you regard as the mode of operation of the machine described in the present Woodworth patent?

37. Do you consider the mere inventing of a machine to constitute a change of principle or mode of operation; do you or not consider the substitution of weighted or yielding bars or plates for the pressure rollers in the Woodworth machine, to constitute an essential change in the principle or mode of operation of the Woodworth machine?

38. Would it constitute an entire change in the principle or mode of operation of the Woodworth machine to connect the bed and rotating planes in a separate frame, and have the pressure rollers stationary, and instead of pressing the plank against the bed, press the bed up against the plank, the bed and rest always retaining the same relative positions?

39. If you shall have stated, in answer to the preceding cross interrogatory, that the change therein suggested would not constitute an entire or essential change of principle or mode of operation, please state in what particular the machine so changed would differ in any, and in what, essential respect from the Norcross machine.

40. Are you engaged as counsel or attorney for the defendants, or either of them, in the present cause, or in any suit, present or future, or for any party using or owning any planing machine or machines, and what particular machine; and if yea, is your compensation contin-

gent on the success of such party, or on the defeat of the Woodworth patent?

41. Have you or not been employed or consulted as attorney, counsel, or adviser by Nicholas G. Norcross on any question of infringement between the Norcross machine and the Woodworth patent; and if yea, is your compensation for such service contingent or otherwise?

A true copy.

Attest: ISAAC O. BARNES, *Clerk.*

Depositions of witnesses produced, sworn, and examined on oath by me, William Dodge, by virtue of a commission issuing out of the circuit court of the United States, within and for the Massachusetts district, to me directed, for the examination of Thomas W. Harvey, Thomas B. Stillman, John Ericsson, Henry R. Dunham, Oliver Byrne, Henry R. Worthington, Thomas W. Wood, Samuel J. Cornell, and John Pendleton, all of the city of New York, taken in the city of New York at the several dates affixed to such depositions, in a cause in said court depending, between Artemas L. Brooks and others, complainants, against John Fiske and others, respondents, in behalf of the respondents, that is to say:

Deposition of Thomas W. Harvey.

A witness, produced, sworn and examined, on the part and behalf of the respondents, deposeth and saith as follows:

To the first interrogatory he says: My age is fifty-five years; I reside in the city of New York; I am by occupation a practical machinist and mechanical engineer. I have been a machinist for forty years, and a mechanical engineer for twenty years. I have been accustomed to examine and compare machines, models, and patents, with a view to their novelty and identity, and I have been frequently examined in patent cases as an expert.

To the second interrogatory he says: I am acquainted with the patent, and its specifications and drawings, mentioned in the interrogatory. I am also acquainted with the reissued patent, mentioned in the interrogatory. The reissued patent does not describe the same invention as the said original patent. There are no weights or springs suggested or described, in any way, in the patent of 1828, by which the guide rollers, marked *f* in the drawings, are made yielding to the inequalities of the boards; such inequalities do exist in unplaned boards, and the machine would be inoperative in the absence of such yielding effect in such rollers, the same being feeding rollers; such rollers are named and described in the specification of the patent of 1845, but they are not shown in the drawings annexed to such specification. In the specification of the patent of 1828 the patentee says, "plank, or other material, resting on the carriage, may be set so as to reduce it to any thickness required," but there are no means described in such specifications, drawings, or suggestions whatever to that effect, but both

are described or suggested in the specifications of 1845. All the rollers shown in either patent are simple friction rollers, turning in fixed eyes or bearings, and this is the case with the revolving cutters, both for the surface planing and for the tongueing and grooving of the edges; and the carriage in the drawings and specifications of 1828 is represented as one entire piece of timber, without adjustibility; the description and suggestion of adjustibility in the specification of 1845 is an addition—a new invention—without which plank of different thickness and width could not well be planed. There are no suggestions in the patent of 1828 in relation to carrying any of the rollers by gearing or belts, and none were needed, further than a pinion to carry the carriage backward and forward; and this, it is suggested, might be carried by either a rack and pinion or rollers, in the following words: "And the carriage, moving by a rack and pinion, or rollers, or by any other lateral motion, to the edge of the knives." Such language does not convey any other meaning than that such rollers, or lateral motion, should perform the same office as the rack and pinion, to reciprocate the carriage back and forward; but such geared rollers are suggested in the specification of 1845, in the form of feeding rollers, leaving out the carriage as a matter of necessity, it being a rigid and stiff piece of timber, incapable of bending around the roller or drum, to make it continuous in motion in one direction, like the motion of such rollers. Such rigid carriage, if retained and used, required to be carried forward to plane a board, passing under the planing cylinder to do so, and then returned back again to receive another; such addition of feeding by geared or belted rollers, did create a new organization of the machine, and changed entirely its mode of operation, making it more expeditious, less expensive in attendance, and changing it from a machine, operated in part by hand, (the carriage movement, as in 1828,) to a machine that might be operated entirely by power, as in 1845. The suggestion in the patent of 1845, "of an endless chain or band passing over or around drums, or chain wheels, or by means of geared friction wheels borne up against it," (the carriage,) is not suggested in the patent of 1828, nor could such chains, as carriers, be introduced, short of expelling from the machine the carriage itself. In fig. 7 of the reissued patent of 1845, the patentee says, that "there may, in this machine"—that is, the new organization, as shown at fig. 7—"be a horizontal carriage, moved forward by rack and pinion, in a manner analogous to that represented in fig. 1," but he does not show, or describe, how such carriage is to be reciprocated, the carriage itself in such figure (7) being suppressed or left out, but such figure (7) represents feeding rollers, as a means of carrying the boards to the machine, the top rollers of which he describes in the specification are to be held down with springs; but such springs are not shown in the drawings, (7,) and showing the top rollers to be held down by their gravity, or weight, only; so circumstanced, the machine would be inoperative. The guide strips, marked R, R, fig. 7, in the drawings of the reissued patent of 1845, is another addition to any thing described or suggested in the patent of 1828. These guides, or their equivalents, are necessary in tongueing and

grooving boards in all practical planing machines. The suggestion in the patent of 1845, as to the adjustibility of one of the cutter wheels for tongueing and grooving, is not contained in the specification or drawings of the patent of 1828, such adjustibility is necessary to tongueing and grooving boards of different widths. The specification of the patent of 1845 describes or suggests a machine having the means of passing a board through it continuously, one after the other, by feeding rollers carried by belts, and having adjustibility in the top rollers by a spring to hold down the board, rising and falling in accordance with the varying thickness of the board, or other material; but none of these qualities are represented in the drawings of such patent of 1845; and with the exception of fig. 7, and a pulley shown on the pinion shaft of fig. 1, (not marked or referred to, and which cannot be used in the organization described in said fig. 1,) all correspond and agree with the drawings of the patent of 1828. Figure 7 describes a different organization from any thing contained in the specification or drawings of the patent of 1828. The specification and drawings of the patent of 1828, describe a machine having a carriage, upon which the material to be planed is placed; such carriage is represented as a long rigid frame, or piece of timber, resting on friction rollers, and moved backward and forward by means of a rack and pinion, having a hand crank, revolving cutter wheels for planing the flat surface of the board, and for tongueing and grooving its edges, such cutting wheels to be driven by any sufficient power communicated through bands and belts, such a machine would be deficient in several things to make it a practical planing machine. I refer to the want of adjustibility to adapt it to boards of different thicknesses, also yielding effect to such pressure rollers, as from its position before the planing cylinder; it is required to pass over the unplaned surface of the board, in holding the board down; also adjustibility in one of the tongueing and grooving cutter wheels; and also adjustibility to the guide pieces to direct the board through the machine, which machine, in the several important respects named, makes it differ from the machine described in the patent of 1845, particularly in the absence of feeding rollers to carry on continuous motion in one direction. The most important improvement made in the planing machines since the days of Bentham, 1793, and a machine which contains the means of such continuous motion, is altogether different from the machine described in the patent of 1828. I therefore state that the new patent is not for the same invention as the old one, and my reasons for that opinion I have given fully and at large.

To the third interrogatory he says: I am acquainted with the two patents and additions mentioned, and with the descriptions of said patents and machines published in the French work mentioned in the interrogatory.

In the specification and drawing of the patent granted to Roguin, March 15, 1817, he describes revolving cutters, a reciprocating carriage, operated with a cord and roller, instead of a rack and pinion, as

in Woodworth's patent of 1828. Such carriage being made adjustable to suit boards of varying thicknesses, and having a pressure bar or guide to hold down the board upon the carriage, and to this extent is substantially the same with the machine described in Woodworth's patent of 1828. Which patent of Roguin's, of 1817, also describes the means of tongueing and grooving the edges of the board by revolving cutters, to be done in the same machine, but not at the same operation. In the said patent of Woodworth, of 1828, it is proposed to do both at the same operation. In such machines of the purport of 1817, all the individual parts necessary to make said Woodworth's machine of 1828 are found, but they are not combined together in the some way. Excepting a surface machine, such parts are combined like Woodworth's patent of 1828. In addition, granted to Roguin in 1818, the revolving cutter is made to rotate upon its axis, and also with the cutter frame is made to travel back and forward, passing over a stationary board, (when in operation,) placed under such revolving and reciprocating cutter. The guide or pressure bar in this machine is carried by the cutter frame, and passes over the board, holding down the same. There is described in said patent of 1818 an improved revolving cutter, which has not been excelled in design, proportion, and excellence of construction up to the present day, as far as my information extends. The specification of the patent granted to Manneville, mentioned in the interrogatory, describes minutely the means of tongueing and grooving the edges of boards, by circular saws, illustrated by a drawing. It also describes the means of passing the board through the machine, moved by two pairs of feeding rollers, and having reciprocating cutters, or "tooled carriers," to dress the surface of the board, unlike Woodworth's or Roguin's, which are revolving cutters. Such reciprocating cutters of Manneville must have cut from the planed to the unplaned surface of the board; one of which cutters or tooled carriers, (there being two separate tooled carriers, a rougher and a finisher, the former moveable to and from the board, and the other not so moveable.) The roughing tool is made to have contact with the board at or before the termination of each cut, detaching the shaving from the board, and thus making it cut at a slight inclination or curvature outward from the face of the board, cutting across the grain more or less in straight grained stuff. Such description of the machine for surface planing in said Manneville's patent is not accompanied with a drawing, but is clear in verbal description. Such planing machine of said Manneville is furnished with a pressure roller, to hold the board to its seat, by adjustable weights, and yields to the inequalities of the board, if any. Said Manneville describes in his patent, in addition to circular saws for tongueing and grooving the edges, reciprocating planes, also a "tool carrier," mounted upon a vertical axle, armed with several irons, (cutters,) resembling much those of plane irons." Which, in my opinion, is meant to describe what are ordinarily called revolving cutters, not saws, but similar to the cutters of hand-grooving planes. It also describes adjustability in guides to conduct the board through the machine, also adjustability in the back

feeding rollers, (corresponding to the top-feeding roller where the board is passed horizontally through the machine,) the pair of feeding rollers being fluted. He also describes a set of feeding rollers succeeding the tool carriers (for planing the surface of the board) to free the board from the machine, having continuous progression, and by which the machine is adapted to use tongueing and grooving apparatus at the same operation. The specification in addition, granted to Manneville in 1825, describes a jointed or hinged carrier, like an endless belt, for tongueing and grooving the edges of the board, and by which continuous progression of the board was attained as a substitute for the stiff and rigid carriage described in the patent of 1824. The machine of Manneville, under his patent of 1825, describes said Woodworth's machine of 1845, so far as it relates to continuous progression; also as it relates to rotating cutters for tongueing and grooving the edges of the boards; also in having a pressure roller to hold the board to its seat. Such machine for tongueing and grooving the edges of the board, and not embracing apparatus for planing flat surfaces of the board, with the addition of Roguin's improved revolving plane, described in his patent of 1818, would make Manneville's machine identical with said Woodworth's machine of 1845, and, as has been stated, such addition was admissible. When thus combined, the mode of operation of Roguin's and Manneville's machines combined is like Wookworth's of 1845 in all respects.

To the fourth interrogatory he says: That the patents of 1817 and 1818 of Roguin describe rotating planes or cutters, (both for the surface of the board and for tongueing and grooving their edges,) and also a pressure bar to keep the board in place on the carriage, and which served the functions of a pressure roller less perfectly, but acting with the like effect in combination with such rotating cutters or planes substantially like said Woodworth's machine. The Manneville patents do not describe such a combination.

To the fifth interrogatory he says: A mechanic skilled in planing machines would be able, without invention, but by a common appreciation of substituting one kind of a cutter for another, *be able*, with the aid of the French patents, to construct a planing machine, such as Woodworth's, so far as a surface planer, without tongueing and grooving.

To the sixth interrogatory he says: I am acquainted with the patent inquired about issued to Norcross, and have also seen a model, in fact an operating machine of full size, made according thereto; and I am acquainted with the reissued Woodworth patent, and have frequently seen in operation machines built upon the plan of Woodworth's patent, and I state that the machine of Norcross is substantially different from the machine of Woodworth in some important respects, in structure, principle, and mode of operation, as follows: In Woodworth's machine, as described in the reissue of 1845, I find the following combination, to wit, two pairs of feeding rollers, one pair placed before and the other pair placed after the revolving cutters, the top rollers of which

are held down by weights or springs; also a small pressure roller, near to the revolving cutters for surfacing, and held down in like manner to the top rollers; a revolving cutter for the surface of the same, for tongueing and grooving the edges of the board, one of which is made adjustable to conform to the varying widths of different boards; these parts all act together, and finish the board at one operation. In the Norcross machine I find revolving cutters like Woodworth's (or Roguin's,) one pair of feeding rollers only, giving continuous progression like Manneville's or Woodworth's machine of 1845; a rest, so called, but really a pressure bar like Roguin's, so far as holding the board is concerned, instead of a pressure roller like Woodworth's, and holding down the board in a novel way, directly opposite to the cutting point. The revolving cutter in Norcross's machine for surfacing is placed underneath the board instead of being above it, as in Woodworth's, by which inversion of cutter to pressure bar permits the pressure bar or rest so to be placed directly opposite to the cutters, and overcomes entirely all of the tremor or jarring caused by the successive blows of the cutter; while in Woodworth's, the pressure bar being several inches from the cutting point, leaves that portion of the board between the pressure roller and the more distant feeding roller exposed to the blows of the cutter unsustained by pressure opposite to it, and causing considerable tremor and vibration to take place in the board, and consequently planing the surface less perfectly than in Norcross's machine. The combinations of the two machines are different, as follows: In Woodworth's there are rotating cutters for tongueing and grooving the edges of the board; in the Norcross machine there is no part or parts for the purpose of tongueing and grooving the edges of the board at all, being a simple surface planer. Also, in respect to the pressure bars of each machine, they are unlike, as stated by me above. There are but two of the elements of organization found in Woodworth's machine which are found in the Norcross machine, to wit, revolving cutters and feeding rollers for continuous progression; and these (the cutters) being found in Roguin's, and continuous progression in Manneville's several patents, of a date anterior to the date of Woodworth's oldest patent, such parts may be considered as old material, and not being contrived or acting like Woodworth's, void all the claims of Woodworth's patent. I would state that the means of holding down the board to its bed or bench, by the pressure bar or rest of Norcross, cannot be attained by substituting the pressure rollers of Woodworth, and vice versa. The advantage or beneficial effect of the difference is, that in Norcross's machine the vibration or tremor of the board is avoided, while it occurs in the Woodworth machine.

To the seventh interrogatory he says: The Norcross has, for the purpose mentioned, the pressure bar or rest that I have already described in part by me. Such rest serves the purpose of holding down the board similar to a pressure roller, but goes beyond and performs other things not effected or performed by a simple pressure roller; the face of such rest, which has its bearings upon the board, and also the face of

the bench having its bearings at the opposite side of the board, underneath the same, are slightly curved in their longitudinal directions in a manner to bend the board, when pressed upon and passed between them in going through the machine, more nearly concentric with the sweep of the cutters than a straight line is to the circle of such sweep, and by which the succession of curved cuts of each cutter of the cutting cylinder, as they pass the face of the board in its progress though the machine, are less perceptible, being of a greater radius when the board, having passed the machine, shall have sprung back to a straight line, and thus producing a more even surface. This curvature of the board in the said Norcross machine has also the effect to compress the grain or fibre of the wood endwise in a longitudinal direction of the board, and by which the same is planed more smoothly than in the Woodworth machine; also, by such longitudinal compressing of the fibre of the wood at the side next to the cutters, has the effect to prevent loose knots from being started out of their position in the board while being acted upon by the cutters; there is no such effect in the Woodworth machine; and making a pressure device in combination with the bench (beneath the board) entirely different from Woodworth's pressure rollers, effecting the same functions better and going beyond it, and producing other effects than are effected in Woodworth's machine; and thus the device in the Norcross machine for keeping the board in place while planing, is substantially different in structure and mode of operation from the rollers in the Woodworth machine for the same purpose.

To the eighth interrogatory he says: That the Norcross machine has a combination of rotating planes with rollers, not substantially like the Woodworth machine for the reasons given in my preceding answer.

To the ninth interrogatory he says: The Norcross machine has not any of the combinations inquired about.

To the tenth interrogatory he says: The firm bench beneath the board prevents the board from being drawn out of its general line through the machine, in combination and assisted by the brace of the arched or bent board, as before stated in the Norcross machine. The pressure roller in Woodworth's machine effects the same object.

To the eleventh interrogatory he says: There is a substantial difference in structure and mode of operation between the solid bench against which the rotating planes cut in the Norcross machine, and the pressure rollers in the Woodworth machine. The Norcross is decidedly the best arrangement; my reasons therefor are as follows: the revolving cutters in said Norcross machine rise and fall with the inequalities of the board, the same being held equidistant from the rest at all times and under all circumstances, and serving the purposes of a gauge, and cutting against the solid and unyielding bench beneath the board, towards which the successive blows of the cutters are directed, do not jar or disturb the board or cause vibration or any tremor, and consequently the work is done smoothly and more perfect than in the Woodworth machine. The revolving cutters in the Woodworth machine gauge the board between such cutters and the bench beneath, cutting from

the bench nevertheless, and against a small pressure roller above the board, supported on stands liable to more or less vibration, and by which insufficient support of rollers and stands, the board is liable to be drawn from the bench toward the cutters, and be reduced more than intended upon the occurrence of a thick place in the board, and thus leaving the same wanting in uniformity and thickness, and defective in quality of work as to smoothness of surface. And I do not know what is meant by the words "substituted difference" in this interrogatory, unless it means substantial difference.

To the twelfth interrogatory he says: That the combination of the moveable cylinder with the fixed bed B, in the Norcross machine, is substantially different in structure and mode of operation from the combination of the fixed cylinder with pressure roller in the Woodworth machine; for these reasons, because, in the Norcross machine, the gauge of the board is not governed at all by the bench, but is between the cylinder and the rest to which the cylinder is attached, rising and falling with it, while in Woodworth's machine the fixed cylinder is in combination with the bench.

THOMAS W. HARVEY.

Sworn, reduced to writing, and subscribed in my presence, at the city of New York, the 17th day of March, A. D. 1851.

WILLIAM DODGE, *Commissioner.*

Cross interrogatories.

To the first cross interrogatory he says: He has before this testified and given affidavits in several causes in court, or in connexion with some application for legal proceedings, under the Patent law, before different persons or officers, but not in court, and that in such affidavits and testimony that he has given opinions on questions of originality and novelty, and of infringement, in connexion with the Woodworth patent; that he has done so several times, but he cannot now recollect how many times, nor at what dates; that he gave his testimony orally, and that it was reduced to writing by the officer or person before whom it was taken.

To the second cross interrogatory he says: That he does not know whether the affidavits given by him on such subjects as above inquired of were to be used ex parte for publication, or how otherwise, though he believes they were to be used in cour, in proceedings relative to the Woodworth patent. He cannot state precisely how many, as he has no memoranda, and cannot recollect; that he gave one affidavit in January last to Nicholas G. Norcross, one of the defendants in this suit, and several others, at the request of George G. Sickles, if by affidavits in the interrogatory the witness is to understand testimony given under commission. They were given at various times, within the past five years, but witness cannot recollect the dates, and has no means of fixing them; that he understood the purpose for which his testimony was

taken in each and every instance, was to be used in some legal proceedings, based upon or relating to the Woodworth patent, and at the request of the persons whose names he has just given.

To the third cross interrogatory he says: That the document which I examined as the original patent and specification granted to William Woodworth, when I first so examined it, and when I last examined it, was a copy of the original, certified under the seal of the Patent office, that I believed then to be genuine and authentic; there was no mark or means of recognising the identity of the instrument so examined affixed by me, but I have no doubt but that they were identical; there can be no possible doubt of their identity and agreement.

To the fourth cross interrogatory he says: The document which [I] examined as the original drawings of the specifiation and patent granted to William Woodworth, when I first so examined it, and when I last examined it, was a copy of the original, certified under the seal of the Patent office; I believe them to be genuine and authentic; there was no mark or means of recognising the identity of the drawings so examined affixed by me; but they were unquestionably identical.

To the fifth cross interrogatory he says: I formed my opinion wholly from the specification and drawings annexed to the certified copies of the original patent I have mentioned. I do not now recollect that I have seen any model of the original, nor any original machine.

To the sixth cross interrogatory he says: The said drawings do not show any adjustibility of the rollers, but only rotating cutters for the surface, and for tongueing and grooving; the rollers in the drawing are all fixed friction rollers; the reissued patent claims combinations possessing adjustability of the pressure. I have before me a copy of the original drawings, which I mark with my name, and it is marked exhibit A by the commissioner.

To the seventh cross interrogatory he says: I never saw any of the original machines of the said Woodworth, nor the model filed in the Patent office, as inquired about, nor can I give any further answer to this question.

To the eighth cross interrogatory he says: I am unable to find in the drawings the device of the adjustable pressure rollers, which device is claimed in the reissue in combination with the rotating cutters. I never saw the authentic model, nor the original machine, used by said Woodworth prior to the granting of said original letters patent. I think, that notwithstanding that I have not all the means of making the comparison, as mentioned in the question, within my knowledge and command alluded to in the question, yet, that great credit and value ought to attach to my opinion, since it is based upon the drawings of the inventor, annexed to his original patent, and which I am compelled to believe have been correctly made by him, and certified copies of which I have examined, and on a comparison of them with the claims made in the reissue, which I have also examined by means of a duly certified copy.

To the ninth cross interrogatory he says: It is undoubtedly one of the purposes stated in the original patent of Woodworth to reduce to

an equal thickness; but the machine as described in the original patent would be inoperative for want of adjustability in several of its parts. I cannot point out any practical mode of reducing, as inquired about, without pressure having ajustability.

To the tenth cross interrogatory he says: I do find in the drawings of the Woodworth patent of 1828 the representation of rollers on each side of the planing cylinder, and on that face of the plank to be planed; the machine could not have work[ed] successfully without the means of self-adapting mentioned; my reason is, because unplaned boards and planks are not of uniform thickness.

To the eleventh cross interrogatory he says: I have not seen the original patents granted in France, but have seen authenticated copies thereof, granted by the Government of France; they did not purport to have come from the book mentioned. I never examined the said work, and do not know its date, and cannot read French, and have relied on the drawings mentioned, and English translation annexed to them. I obtained the only knowledge that I have of the dates of the French patents from what I saw in the said certified copies; the translation is annexed, marked exhibit D and E.

To the twelfth cross interrogatory he says: I have no knowledge.

To the thirteenth cross interrogatory he says: I find the combination in Roguin's rotating planes, with pressure bars, analogous to pressure rollers, performing the same office, though not so perfectly; and I find in Manneville's rotating cutters, with feeding rollers for tongueing and grooving. I therefore state that you would have to refer to both of said French patents.

To the fourteenth cross interrogatory he says: I cannot give the words of the French patents, as requested, nor the letters in the drawings, excepting the pressure bar, which is marked L. I do not find that the plank is to be held by clamps or dogs; the cylinder is formed as stated in the question—cut out of a solid block of metal; but in the addition of 1818 they are described as made up in parts, having cutters attached to a cast-iron centre, in the most approved form of a cylindrical cutting wheel of the present day. I find nothing to pass over the surface of the plank to be planed, other than the cross piece marked L, called a "guide," and not marked X, as stated in the question.

I find described, or represented, a mode by which the cross piece or guide is pressed down, as inquired about, upon the surface of the plank, and made to yield to any varying thickness of the plank; this appears, in the certified drawings, as thumb screws at the end of rods, passing through the ends of the guides; if it be on the unplaned side it must therefore have had adjustability. I do not find any such cross piece or guide, stationary or yielding, on both sides of the rotating cutters; but only on one side, holding down the board near the cutters, the board otherwise being held by dogs or clamps. I should have stated above, that if the said bar or guide is placed on the planed side of the cutters, the guide would not require any yielding, since adjustability is found in the bed or carriage, to meet the contingency of boards of different thicknesses;

but if the guide be on the unplaned side, there must be yielding adjustability, or be inoperative; if it be only on one side, a machine for planing would answer a good purpose (practical) with it on the planed side; but the side on which it should be would depend on the fact, whether it were yielding, adjustable, or rigid and fixed; and a machine would answer a good purpose if due regard were had to the character of the bar in respect to its location. In the patent of March, 1818, I do find the rotating cutters combined with a pressure roller, or its equivalent; it has no letter in the drawings; it is a cross piece, the same as in the patent of 1817. I do not find that it is made self-adapting; it is not represented as permanently attached, but it is borne by the carriage, as stated in the question; and I believe that it is permanently attached, and that it follows after the cutters, and close to them; the weight is stated about 200 pounds. A practical machine could be made on this plan, but not an expeditious one, not so expeditious as a progressive continuous movement; the weight would be sufficient with a light cut; if more were required, weight could easily be added. If the guide and planing cylinder were connected together they would both rise together, and thus plane the plank to a varying instead of an equal thickness. Upon examination, I find I was mistaken in saying that the cross piece follows after the cutters, I should say that it goes before the cutters, and therefore must have been yielding, or the machine could not have operated. I refer in my testimony, exhibit D, on which I write my name, it is hereto annexed.

To the fifteenth cross interrogatory he says: I have not so stated; the first patent of Manneville does in effect say, that the plank to be tongued and grooved is to be securely adjusted on a carriage, but for the exact statement thereof I refer to exhibit E, page 4, lines 4 to 8, if by "adjusted" the question means "fastened." I find the pressure roller in combination with a weight or lever to hold down the board in exhibit E, page 4, lines 9 to 27; this roller is to be applied to the face of the board, E, page 4, lines 11 to 13; it is practicable because experience has proved it to be so; to be practically useful, in addition to the pressure rollers, the plank must be fastened to the carriage by some plan as suggested in the question. The mode of tongueing in Manneville's patent is by five circular saws, the mode of grooving is by three circular saws, and reciprocating cutter for completing the groove. This mode of tongueing and grooving is done upon the same general principles as in Woodworth's plan, and they are substantially the same.

To the sixteenth cross interrogatory he says: The mode mentioned would not prevent the plank from moving laterally whilst being tongued and grooved; the plank is fastened to the carriage, and therefore is not liable to any such movement; the fastening to the carriage prevents it.

To the seventeenth cross interrogatory he says: I think I understand it, and believe that small sized saws might be placed in an eighteen inch cylinder and do the work; I do not understand that he would enclose the gearing in such a cylinder, nor the driving pullies, and the cylinder might also enclose the reciprocating plow to cut out the groove.

To the eighteenth cross interrogatory he says: They are applied to each side of the flat surface of the board, and not the edge. The plank went through the Manneville machine on its edge and rested on the horizontal friction rollers. The fluted rollers being vertical, *and* they are applied to the flat surface and not to the edge.

To the nineteenth cross interrogatory he says: I do understand it; the planes are constructed in the manner mentioned in patent, and which is to me very clear, as follows: there are two planes, which I would call a rougher and a finisher; they are kept down to the face of the board by a tool bearer, and are moved backward and forward by a crank motion. The rougher is moveable to and from the board by being held to it by a spring; the finisher is immoveable, principally, from the board, except to separate the shaving from it. The position of the board is edgewise, resting on horizontal rollers, friction rollers; it is carried through by a pair of fluted cylinders or rollers, vertical and parallel to each other, which rollers press upon each side of the board, one of which, the back one, is made to slide in its boxes, held up by a spring, and thus made to yield to the inequalities of the thickness of the board. Another pair holding the same vertical position, called discharging cylinders, neither of which are yielding, nor are they fluted; and to adjust to different thicknesses, the inventor suggests rollers of different diameters; such a machine must have an adjustable bed. I accompany this description with a sketch as desired, and do it without the exercise of any knowledge of planing machines derived from other sources.

[See exhibit attached.]

To the twentieth cross interrogatory he says: I do not. There is no drawing; they are clearly described in words.

To the twenty-first cross interrogatory he says: The addition does apply, solely, to a mode of feeding by means of an endless chain, as stated in the question, or principally so applies; it also applies to the modification of the roller for taking the warps out of planks, that is, to a "gallet" having flanges at each end, and which rest on the board. The dogs and bolts, which are attached, do project as mentioned in the question. The shuffle board is not grooved, but the middle portion is less in diameter by an inch than the flanges at each end, and therefore permits the passage of the projecting bolts. This mode is applied to the tongueing and grooving, and not to planing the surface; and the operation, being at the edges, admits of the passage of the projection, and there are no cutting edges of surface planes to be injured; instead of "gallet," I should say "shuffle board, held down by a spring."

To the twenty-second cross interrogatory he says: From both the French patents, by placing Manneville's feeding rollers in Roguin's machine, or rather substituting Manneville's feeding rollers in place of Roguin's reciprocating carriage; and, I think, the mechanic could have done it under the proposed hypothesis.

To the twenty-third cross interrogatory he says: The plank is held against a moveable rest, and not a solid bed; such rest forms the gauge, between it and the cutters, to secure equal thickness, and prevents vi-

bration; and as the rest rises or falls, the cutters do the same, being arbitrarily attached.

To the twenty-fourth cross interrogatory he says: That when the plank is being planed, as stated in Woodworth's machine, the plank is not firmly held against a solid bed or rest, as stated in the question, but is held against the pressure roller; the tendency is to vibrate against the pressure roller above the plank, and from the bench.

To the twenty-fifth cross interrogatory he says: In both there are rotary cutters; in Woodworth's there is nothing to keep the plank in contact with the rest but the pressure roller above the plank, which is several inches from the cutters at the cutting point; the tendency is to draw the plank towards the axis of the cutter when it makes a heavy cut. In the Norcross, the rest holds the plank to the solid bench, and the bench extends much nearer to the cutting point than the pressure roller.

To the twenty-sixth cross interrogatory he says: Each is intended to produce that result.

To the twenty-seventh cross interrogatory he says: In the Norcross the vibration of the plank is entirely obviated, and in the other it is not.

To the twenty-eighth cross interrogatory he says: The Norcross does smoother work, and may be run very much faster, and do better work; it is a change in principle. In the Woodworth the plank may be compared to a harp-string, on which the cutters beat, and subject to vibration; while in Norcross, the plank, bent into an arch, is held firmly between two solid bodies, incapable of vibration.

To the twenty-ninth cross interrogatory he says: They do. The new principle is to hold the plank absolutely firm, and bending it, slightly arched, while planing.

To the thirtieth cross interrogatory he says: First, it does; second, it holds firmly against a bed and rest, as stated in the question, in the manner already stated by me.

To the thirty-first cross interrogatory he says: There is such device for preventing the board from being drawn towards the axis of the cutters, and for planing and reducing at the same operation, and for arranging the machine, as stated in the question, and admits of adjustment to determine the exact thickness that shall be left after being planed. The surfaces, between which the plank passes, do vary to accommodate the varying thicknesses of the plank, the cutting cylinder and rest remaining at the same distance apart; but, instead of having the varying surfaces self-adapting by pressure, to keep one face of the plank against the rest, the rest itself keeps the one face of the plank firmly pressed against the bench, and the bench is advanced in very close proximity to the cutters. In the Norcross machine, the action of the cutters, in taking off a thick shaving, is to draw the plank closely, or more firmly, against the bench or fixed bed, while the bench or bed prevents it from being drawn into the cutters; while in the Woodworth machine, the taking off of a thick shaving by the cutters tends to draw up the plank from the bed towards the cutter, without there being any opposing resistance except the distant roller.

To the thirty-second cross interrogatory he says: I attach to the words "principle of a machine" the definition of the words "principle of action." I do understand that the use of analogous devices may change the principle of action in a machine, because analogous devices are not the same in all respects; but the use of mechanical equivalents would not change the principle of action, because equivalents equal each other.

To the thirty-third cross interrogatory he says: The examination of machines and study of mechanics, and the practical construction of a great many different machines, in different branches of mechanism. I have also invented machines, about a dozen patented. I cannot state exactly my years of study. I commenced it with the first cotton machinery in this country, or among the first. It has been my study for forty years. I have been consulted as an expert for a great many years, and have been used as such in court for at least ten years. I cannot state how many times I have testified as an expert, but very often. I have been a practical mechanic forty years, and was practically engaged in constructing cotton and woollen machinery, screw machinery, presses, machinist's tools and machines, and many other kinds in wood and metal.

To the thirty-fourth cross interrogatory he says: I have; but then I had no knowledge of the French machines, or Norcross, and I have so testified several times.

To the thirty-fifth cross interrogatory he says: The revolving cutters, continuous motion, adjustability of the parts, means of gauging and holding the board steady to the cutters, and an arrangement by which boards may be planed, tongued, and grooved, at one operation.

To the thirty-sixth cross interrogatory he says: By revolving cutters.

To the thirty-seventh cross interrogatory he says: It may be either or both. The substitution of weighted or yielding bars, or plates, for the pressure rollers in Woodworth's machine, would not constitute an essential change in the principle or mode of operation of the machine, if they were supplied in the same manner as the pressure rollers, and at the same point.

To the thirty-eighth cross interrogatory he says: It would constitute an entire change in the principle or mode of operation, because in the Woodworth machine, the cutters and the pressure rollers are on the same side of the plank, and the duty of the rollers is to keep the plank from being drawn into the cutters and down upon the bed. The cutters and the bed form the gauge of the machine; and it is a very different thing whether the cutters and the rollers are on the same side of the plank, or whether the pressure roller is adjustable, and presses on the plank from the opposite to the cutters, and pressing the plank up against the cutters. In the case supposed in the question, you change the relative position of cutters to bed, and therefore change the principle.

To the thirty-ninth cross interrogatory he says: I have stated that it

would constitute an entire or essential change of principle or mode of operation. In the preceding question it is predicated, that the bed and rest, under the supposed arrangement in the Woodworth machine, always retain the same relative position. In the Norcross machine, this arrangement does not exist, and this distinguishes the Norcross from the Woodworth ; for, in the Norcross, the bed and rest vary their relative positions to suit the varying thickness of the plank; in the Woodworth no such change can occur, the rollers are applied in a different manner .

To the fortieth cross interrogatory he says : I answer to the whole, no.

To the forty-first cross interrogatory he says : I answer to the whole question, no. I have never given *dis*interested testimony, in relation to questions between the parties.

THOMAS W. HARVEY.

Sworn, examined, and subscribed before me, the 21st day of March, A. D. 1851.

WILLIAM DODGE, *Commissioner.*

Deposition of Thomas B. Stillman.

A witness produced, sworn, and examined on the part of the complainants, deposes and says :

To the first interrogatory he says : He is aged forty-four years. I reside in the city of New York, and am an engineer by occupation, and a machinist, of the firm of Stillman, Allen & Co., of the Novelty Works, New York. I have been engaged in my occupation twenty-three years. I have been accustomed to examine and compare machines and patents with a view to their novelty and identity. I have several times been examined in patent cases as an expert.

To the second interrogatory he says : I have examined the patent and specifications of Mr. Woodworth, dated 27th December, 1828, for an improved planing machine ; and also the specifications and drawing of the patent reissued to William S. Woodworth, as amended, dated 8th July, 1845. The amended specification contains improvements not named in the original, nor shown in drawings of either date, viz : there are no springs or weights, described in the patent of 1828, for the purpose of an accommodating pressure to the unequal thickness of plank to be planed; nor feeding rollers, as described in specification of 1845, these being radical improvements not suggested by the original papers. In the specification of 1828 no method is described for setting the carriage so as to reduce the plank to any thickness required ; but in that of 1845 a method is described which is an addition of no small consequence. There are no suggestions in the patent of 1828, for giving motion to the plank by rollers, gearing or belts, except the simple rack and pinion, as shown in the drawing, for moving the carriage back and forth. But the specification of 1845 claims "rack and

pinion, or rollers, or any other lateral motion," and includes feeding rollers, which produce a continuous motion, a thing impracticable in the machine of 1828. This I consider an important addition, and, therefore, I say, that the reissue does not describe the same invention as the original patent, nor is the new patent for the same invention as the old one.

To the third interrogatory he says: I am acquainted with the Roguin patent and addition, and the Manneville patent and addition, and with the published description. These two contain all the points substantially of the two Woodworth machines; both Roguin's and Woodworth's have a sliding bed, or carriage, upon which the plank is secured, though Roguin's is the more complete, being adjustable by screws to suit plank of different thickness; both are for tongueing and grooving and planing boards or plank, with rotating cutters, at one operation; both have analogous means of preventing the plank from rising from the bed by the action of the cutter. These parts and combinations are substantially the same, and they compare in their mode of operation, so far as I can judge, as if they were the same invention—Roguin's, as compared with Woodworth of 1828, being the better of the two.

To the fourth interrogatory he says: They have.

To the fifth interrogatory he says: He could make the whole without invention.

To the sixth interrogatory he says: I am acquainted with the Norcross patent, and have seen a model and have seen a machine; and I am also acquainted with the reissued Woodworth patent, and have seen the machine in operation. The Norcross machine is substantially different in structure, principle, and mode of operation, from the Woodworth machine. Both have a bench or bed, the Norcross machine and the Woodworth. Both have revolving cutters. In Norcross, the cutters are under, in the other above the bed. Norcross machine's bed, or a part of it, intervening between the cutter and the plank, prevent their (the plank and cutter) being drawn together when in operation; the Woodworth machine requiring a roller or an analogous device to prevent the plank from being drawn into the cutter upward. The knives and the bed in Norcross machine are variable, and accommodate the unequal thickness of the plank. The Woodworth machine has a pressure roller to prevent the plank from leaving the bed; the Norcross machine needs none, as by the position of the cutters and bed they cannot be drawn together. In the Norcross machine the cylinder being under the bed, and the gauge or guide being above the bed, the advantage is, tremulous motion and tendency to splintering are prevented, by which thinner stuff may be planed, and the great danger avoided to the workmen by the knives flying off, and knots and splinters flying off; and the shavings conducted so as to reduce the danger of fire. These are the beneficial effects. Also, greater rapidity of operation could be obtained.

To the seventh interrogatory he says: It has a peculiar device with

the bed. It is entirely different from the rollers in Woodworth's machine, in structure and mode of operation.

To the eighth interrogatory he says: It has not.

To the ninth interrogatory he says: It has not.

To the tenth interrogatory he says: In the Woodworth the pressure rollers; in the Norcross the bed of the machine.

To the eleventh interrogatory he says: There is a substantial difference between them; the bench is the best for cutting against; the bench or bed is the firmest, reaches nearest to the point of contact between the roller and plank, and preventing in a great measure the vibration of the other machine.

To the twelfth interrogatory he says: It is substantially different in structure and mode of operation; the pressure roller is necessary in Woodworth's and not in Norcross's.

T. B. STILLMAN.

Sworn, examined, and signed before me, the nineteenth day of March, A. D. 1851.

WILLIAM DODGE, *Commissioner.*

Cross interrogatories.

To the first cross interrogatory he says: I do not recollect; I may have done so.

To the second cross interrogatory he says: I do not recollect that I have.

To the third cross interrogatory he says: I have seen certified copies of the papers referred [to;] I do not recollect when, and did not mark them; and I have now before me a certified copy of the papers marked exhibit A, by the commissioner, and on which I write my name.

To the fourth cross interrogatory he says: I examined certified copies of the drawings mentioned; I do not recollect when, and did not mark them; I have now before me a certified copy of them marked as in my last answer.

To the fifth cross interrogatory he says: I formed my opinion from the patent, specifications, and drawings annexed, not from the machine or original model.

To the sixth cross interrogatory he says: The only devices common to the reissue and the drawings, are the revolving cutters and the bed; I cannot give any more particular description; a copy of the original drawings is annexed, marked exhibit A.

To the seventh cross interrogatory he says: I did not see any of the machines before 1829; I never saw the model filed in the patent office. This question is so badly and obscurely put that I cannot tell what is wanted; I presume the object is to ascertain what knowledge I may have of the Woodworth machine, and how obtained. I never saw a machine constructed in accordance with the specifications and drawings of the original machine; my knowledge of the original machine is derived from the certified copies of the specifications and draw-

ings annexed to the original patent as I have stated. I have also assisted in putting in operation machines made in accordance with the specifications and drawings annexed to the reissue; and I have seen and examined certified copies of the specifications and drawings; such a copy is hereto annexed, marked by the commissioner exhibit B, and on which I now write my name.

To the eighth cross interrogatory he says: In the reissue are claimed the combination of rotary planes with rollers, and the combination of rotating planes with cutter wheels for tongueing and grooving at one operation. These are found in the original drawing; but the combination of rotating planes with pressure rollers, which is found in the reissue, is not in the drawings. With regard to the credit and value to be attached to opinions, as inquired about, I would say that great credit might properly be given to an opinion based upon an examination of the reissue and its specifications and drawings, and by a comparison with the original patent and its specifications and drawings, without any examination of the identical machine, or of all the evidences alluded to in the question.

To the ninth cross interrogatory he says: Such is one of the purposes stated. In the original machine the rollers appear to be fixed, and, therefore, plank could not be reduced to a perfectly uniform thickness by that machine. It would require self-adjusting in pressure rollers, to make good work, or some other mode of producing that effect. The rest made by Norcross admits of more perfect adjustment, and consequently reliably produces a uniform thickness, in its connexion with the cutters operating against an unyielding bed.

To the tenth cross interrogatory he says: I do find the rollers as mentioned in the question; in answer to the last clause of the question I say, that if by successfully is meant planing with the accuracy of modern machines, they could not; but they may have worked in a rude manner suitable for rough purposes. My reasons are that to plane accurately there must be a self-adjusting mode of holding the plank.

To the eleventh cross interrogatory he says: I never saw the original patents; I have now before me authenticated copies of them marked by the commissioner exhibit C, and on which I write my name; they are not from the book mentioned; I do not read the French language; I relied on translations hereunto, annexed and marked by the commissioner exhibits D and E, on which I write my name; D, being Roguin's, and E, Manneville's.

To the twelfth cross interrogatory he says: I have no knowledge.

To the thirteenth cross interrogatory he says: I find the combination in Roguin's patent in the drawing, the combination of the rotating cutter with the pressure bar, or roller, or what by the representation in the drawing appears to be a bar or roller; and in Manneville's specification I find rotating planes with two fluted cylinders placed parallel to each other, pressing the board on both sides, the boxes of one stationary, and of the other moveable, to answer the variations of the thickness of the board to be planed; a spring or weight upon the moveable

to produce an equal and constant pressure upon the board; these are feeding rollers of Woodworth's reissue, marked F, F, fig. 7, of Woodworth's reissue. I find in Roguin's the pressure bar marked L, L, in combination with rotating cutters.

To the fourteenth cross interrogatory he says: The words of the French patent are, "*V*, is a simple plane, solely intended to plane;" "*L*, cross bar of wood or iron, called guide." The drawing is entitled, "Plan et elevation de la machine, &c." Fig. 1, attached to the copy of Roguin patent, exhibit C, patent 1817. I find also in the patent of Roguin, 1818, these words: "We have seen in the description of the first machine that the piece called guide, because it serves effectually to guide the wood under the tool for grooving, tongueing, and moulding, was fixed on the superstructure of the bench; in the new machine this piece is borne by the carriage."

I find the dogs in the patent of Roguin of 1818, and not in the one of 1817. I find the instrument called the "burr cutters" in the question in the Roguin drawing of 1817, but I find the rotating planes, as in Woodworth's machine, having blades, in the Roguin drawing of 1818. They are otherwise than "burr cutters," because they are blades, like plane irons, fixed and adjusted by screws to the cylinder. I find only a cross piece, with the letters *L*, *L*, and not *x*, called a guide. I find represented in the drawing thumb screws or springs to press down the guide to suit the varying thickness of the plank. I find such guide on one side of the rotating cutters only, and a machine for planing would answer a good practical purpose if it had only one, if on the proper side. In the patent of 1818 I do find rotating planes, with a guide upon the same side of the plank, which is an equivalent to a pressure, but in the drawing of 1818 it is not lettered; it is lettered in the drawing of 1817 as *L*, *L*. It does not appear to be made self-adapting, but has thumb screws; I have already pointed it out in my answer to the first part of this question, both in the drawings and description. In the drawing of 1817 the guide is not represented as permanently attached, but is attached by screws with thumb nuts; in the drawing of 1818 the mode of attachment is omitted. The weight of the carriage is specified in the specification, but it is also stated that "it should be of sufficient weight, so as not to be raised by the strain of the tool." A practical working machine could be made on this plan. The sufficiency of the weight would depend upon the size of the piece and the depth of the cut. If the planing cylinder and guide were connected together on the same moveable carriage, they would yield together, and produce a varying thickness in the plank. But the object of the guide is not alone to produce equal thickness, but to prevent the plank from being drawn into the cutters.

To the fifteenth cross interrogatory he says: I do not say any such thing. I find it stated in the Manneville patent of March, 1825, "that the board to be grooved is previously well fixed in a carriage, driving between two conductors, which allow it no variation in any way, and which carries the wood to be worked at the will of the oper-

ator." The pressure roller mentioned in this patent is used in connexion with the plan of securing the plank to the carriage. The roller is to be applied by the medium of a lever, moved by the foot, or a weight. I deem this practicable, because a pressure roller has been found practicable in subsequent machines. The use of one roller, without any other means of securing the plank to the carriage, would not be so effectual or practically useful as two rollers. The mode of tongueing is, as stated in the question, by five saws, and grooving by three saws, with reciprocating cutters for finishing. This mode of tongueing and grooving is substantially similar to Woodworth's. My reasons for this opinion are, that each saw is a thin cutter, and both have a circular motion.

To the sixteenth cross interrogatory he says: I cannot say that it would.

To the seventeenth cross interrogatory he says: I should understand him to mean by that, that the cutters could be thus enclosed. I think I understand his patent.

To the eighteenth cross interrogatory he says: To the faces; the sides of the board being identical with the faces, in contradistinction from edges. It is stated that the plank is to be placed on rollers that have their axes horizontal, and that the two fluted rollers are vertical and parallel. Now, as the plank in the machine rests on its edge, the two fluted rollers press against the faces of the plank, and not the edges.

To the nineteenth cross interrogatory he says: I understand them to be reciprocating cutters, operating by means of a crank motion. I could make a drawing without the exercise of any knowledge of planing machines derived from other sources, but have not time to make it.

To the twentieth cross interrogatory he says: I do not. There are drawings, and they have been marked as an exhibit.

To the twenty-first cross interrogatory he says: They do substantially. The dogs and bolts do not necessarily project above the surface of the plank; the roller is not grooved for the purpose. The question put is inappropriate. The mode might be applied, and there would be no chance for the dogs or bolts to come in contact with the cutting edges of the planes.

To the twenty-second cross interrogatory he says: It could be made from Roguin's, by taking the bed and guide from 1817, and the rotating cutters from the patent of 1818, and thus make a better machine than the machine of 1828 of Woodworth.

To the twenty-third cross interrogatory he says: The plank is not held against the plate or bed, or rest, as stated in the question; but the plank is held down by the rest against a firm bed, and the rest serves as a guide, while the bed of the machine performs the office that the pressure rollers do in the Woodworth machine; the bed prevents the plank from being drawn into the cutters, which is the office of the pressure rollers in the Woodworth machine. The object of holding the plank is for the purpose stated in the question; but the pressure is in the contrary direction from that in the Woodworth machine; so far

as relates to the cutters in the Norcross machine the pressure is towards the cutters; in the Woodworth, the pressure is from the cutters.

To the twenty-fourth cross interrogatory he says: It is, but while the pressure is applied to the Woodworth machine, to prevent the plank being drawn into the cutters, in the Norcross machine it is applied to prevent the plank getting away from the cutters.

To the twenty-fifth cross interrogatory he says: They both have rotary cutters to plane the board. In both machines the plank is supposed to be kept in contact with the rest; and the object is to reduce it to an equal thickness; but the device for that purpose in the two machines is different, as I have before stated.

To the twenty-sixth cross interrogatory he says: Yes.

To the twenty-seventh cross interrogatory he says: In the original Woodworth machine no method is described of adjusting the cutters to the varying thickness of a single plank ; but simply to set the machine to planks or boards of one, two, or three inches thick, and so on. In the reissue of Woodworth there is described a contrivance for adjusting the pressure to the inequalities in a single plank. In the Norcross machine there is a provision for adjusting the cutters to the varying thickness of planks or boards, or to the inequalities in a single plank or board. They all act with rotary cutters. The Woodworth machine has its cutters adjusted to a plane, parallel with the bed ; and the plank travelling between the two is reduced to the required thickness; the bed and the cutters being permanently fixed in their relation to each other. The Norcross machine, the cutters, and the bed are not fixed in their relations to each other; the cutters do not traverse in the same plane with the bed; but the cutters vary, according to the inequalities of the plank, and the guide or rest varies as the cutters vary, they being attached to each other, fixed in the same frame work.

To the twenty-eighth cross interrogatory he says: The result of the change introduced in the Norcross machine is to produce a deflection, as required for the purpose of more perfectly planing; a deflection or bending of the plank is produced at the point of contact with the cutter, whereby more favorable action is produced; knots are held fast ; splinters are kept from flying off ; also, it has a more unyielding bed, against which the cutter acts, preventing vibration, or rendering it more difficult. The general principle of the two machines is the same, being both for planing plank by rotary cutters. The difference in the two machines is in the mode of adjusting the plank to rotary cutters. The principle of the two devices is different. The principle of the Woodworth machine, which is changed, is the mode of adjusting the plank. In the Woodworth, the plank passes between the cutters and the bed without any variation, and the cutters cut from the bed, and draw the plank from the bed, against the moveable or fixed roller. In the Norcross machine, the cutters cut towards the bed, and draw the plank in the direction towards the bed; this admits of the application of a contrivance, of which the Woodworth machine is not capable; in this it differs in principle from the Woodworth machine, which is the

mode of adjustment admitting of curvature of the plank, in the mode above stated, and of planing very thin boards.

To the twenty-ninth cross interrogatory he says: They do; the new principle introduced is in the position and relation of the plank to the fixed bed, and the contrivance of adjusting the guide and cutter.

To the thirtieth cross interrogatory he says: They do, but the board is held firm against the bed, by the cutter and the guide acting in concert, while the cutting is on the same side as the bed, and not on the opposite side.

To the thirty-first cross interrogatory he says. The relative position of the cutters and bed, renders any other contrivance unnecessary, to prevent the board from being drawn towards the axis of the cutters, by the operation of planing; this is not the case with the Woodworth machine, and it, the Norcross machine, does plane and reduce to an equal thickness by the same operation; and it admits of arranging the machine to admit boards of varying thickness, to be fed to the cutter. It does admit of adjusting the periphery of the cutter, at a fixed distance from the rest or guide, which is on the opposite side of the plank or board, to determine the exact thickness that shall be left, after being planed. The bed is on the same side with the cutters. It does admit of having the surfaces between which the plank passes, vary in their distance from each other, accommodate the varying thickness of the plank, whilst the cutting cylinder and the rest opposite to it, remain at the same distance apart. It does admit of having this varying distance of surfaces, self-adapting by pressure, to keep one face of the plank against the rest.

To the thirty-second cross interrogatory he says: He understands by the term "principle of a machine,"—the peculiar adjustment or arrangement of the parts of a machine, whereby the desired result is obtained; analogous devices, or mechanical equivalents, do not change the principle.

To the thirty-third cross interrogatory he says: My occupation from my childhood, or the beginning of my apprenticeship, and having from thence been constantly engaged in the construction and designing of machines for various purposes, and the examination of machines presented for an opinion, and having been for many years past an active manager of an establishment for the construction of machinery. I have been an expert for many years, and I have testified as such several times; cannot recollect how many. I have been a practical mechanic twenty-three years, and am now in the manufacture of steam engines and machinery generally.

To the thirty-fourth cross interrogatory he says: I doubt whether I have; I do not know. I may have, but cannot say; I may have seen them.

To the thirty-fifth cross interrogatory he says: The principle embodied is the combination of rotary planes, with rollers, or analogous device, to prevent the boards being drawn up by the planes, when cutting upwards; and also the combination of rotary planes, with cutter

wheels for tongueing and grooving at one operation; the combination of tongueing and grooving wheels at one operation; and the combination of either the tongueing or grooving wheels with pressure rollers.

To the thirty-sixth cross interrogatory he says: The mode of operation is by the combination of certain parts called pressure rollers and revolving cutters, for the purpose of planing, tongueing, and grooving boards at one operation, so that the plank being laid upon a moveable bed, the surface of which is a plane, and the rotating cutters at a fixed distance from it, the tongueing and grooving cutters at the edges, the plank is passed through, and its surface is planed, and its edges tongued and grooved.

To the thirty-seventh cross interrogatory he says: In the general sense it is not; but in reference to devices, for more perfect or different effect, in such parts as produce this effect desired, I would correct the above. Invention of a machine or parts of a machine, does constitute a change of principle or mode of operation, although the result produced, in a general sense, may be the same as the invention of a stove. Parts of a stove involve a principle, in such stove a part; yet the general effect being to warm the apartment, is substantially the same in all stoves, in a greater or . I should think the substitution mentioned in the question, merely of itself, would not constitute an essential change in the principle or mode of operation of the Woodworth machine.

To the thirty-eighth cross interrogatory he says: It would not, unless it required some new combination to make it effective.

To the thirty-ninth cross interrogatory he says: The distinction is, that the Norcross machine would differ in the bed, being stationary, and neither the rest nor the cutter retaining the same relative position to the bed, as was suggested in the preceding question. The mere inventing of a machine does not effect a change of principle, unless some new agent or device be required for its proper operation.

To the fortieth cross interrogatory he says: I am not engaged.

To the forty-first cross interrogatory he says: I have not.

T. B. STILLMAN.

Sworn, examined, and subscribed before me, the 25th day of March, A. D. 1851. WILLIAM DODGE, *Commissioner*.

Deposition of Henry R. Worthington.

Henry R. Worthington, a witness produced, sworn, and examined on the part of the respondents, deposes and says:

To the first interrogatory he says: I am 33 years of age; I reside in Brooklyn, Long Island, and am employed in manufacturing therein machinery; I have been so employed since the year 1844. I have been concerned in mechanical business for the last ten years, and have been accustomed to compare machines and patents. I have never but once before been called upon to testify publicly in a patent case.

To the second interrogatory he says: I want in the outset distinctly to state, that in all my answers I shall confine myself exclusively to that part of the machines referred to which pertains to the operation of planing the surface of boards, and not to that of tongueing and grooving, unless particularly stated. In the old patent, Woodworth declares his invention to be the "improvement and application of cutters and planing wheels to planing boards, planks, timber, or other materials." In the reissued patent he claims as his invention the employment of rotating planes, in a certain combination. The claims are different, the descriptions are different, and so far as described the inventions are different. I come to this conclusion from examination of the drawings and specifications alone, having never seen the original Woodworth model, nor a copy of the same, nor an original machine.

To the third interrogatory he says: I am acquainted with these patents. To the question, whether the same contain or describe any and what part of the invention described or set forth in the Woodworth patents, I answer, that Woodworth's claim is based upon a new combination of parts which, separately considered, appear to be old. For example, the rotary planes or cutters are described in Roguin's patent; the first one, as planes which "are cylindrical;" "the blades with which these cylinders are furnished are cut out from the thickness of the iron;" "they are shaped obliquely." In his patent for improvements and additions he describes "the cutters" as a cast iron cylinder, in which moveable blades are held in a pair of jaws.

The pressure rollers for keeping the board down in its place, while under the action of the cutters, appear in the patent of De Manneville, described in the following words: "To obviate the plank presenting itself to the action of the tools with the least possible curve, I make use of a weight which bears by a roller upon the board at the spot where the planing is about to begin." Again he speaks of "two fluted cylinders, C D, vertically placed parallel to each other, which press the board on both sides, the boxes of one, C, are stationary;" those of the other, "moveable in gutters, to answer the variation of the thickness of the wood to be planed; the effect of the spring or weight on the hind boxes, determines the equal and constant pressure of the cylinder against the board." The mode of operation in all these machines is very similar.

To the fourth interrogatory he says: In a plate of Roguin's machine, contained in 23d volume Brevets d'Inventions, I find figured a bar, just before the cutters, underneath which bar the board passes. No accurate description is given of this bar, and but one view is shown of it, so that its precise nature or arrangement cannot be determined. It is marked L. To have been of much value it must have been adjustable, and it may have been of elastic material, or have been held down by spiral springs acting upon its lower surface.

To the fifth interrogatory he says: If a mechanic were skilful in planing machines, he would know that Roguin's machine would be practically very imperfect, if not entirely useless, unless he were to

make the bar, L, self-adjusting. He would, therefore, construct it so as to exhibit the combination of a rotating plane with a self-adjusting pressure bar, and that would be a machine very similar, if not identical, with Woodworth's. But at the time of Roguin's or Woodworth's invention, a mechanic, otherwise skilful, might not be skilful in planing machines.

To the sixth interrogatory he says: I am acquainted with the Norcross patent of 1850, and have inspected a model shown as his. I am acquainted with the reissued Woodworth patent, and have seen a machine said to be made according thereto. The Norcross machine has substantial points of difference, although the two machines are very much alike in construction and general mode of operation. To compare the two machines with each other, I consider it necessary to refer only to that part of the Woodworth machine which he claims as his invention, and defines as new in his specification and claim.

The "combination of the rotating planes with rollers, or other analogous device, to prevent the boards from being drawn up by the planes, when cutting upwards from the planed, or reduced to the unplaned surface," comprehends as much of the Woodworth machine as he claims to be his invention. The limits of this combination are clearly defined, and its objects set forth. In the planing operation, he says, "the tendency of the plane is to lift the board directly up against the rollers," as no other motion or tendency of the plank is stated. I may fairly assume, that the sole office of the pressure roller is, as stated, to hold the board down; therefore, the elementary Woodworth machine comprises three distinct parts; first, a bed or carriage, upon which the plank is placed, and upon which it is necessary to have it bear firmly while undergoing the process of planing; second, a rotating cutter, located above this bed, and over the plank; this cutter operates in the manner specified, to lift the plank away from the bed, and draw it up towards the centre of the cutter; third, a system of self-adjusting rollers, which constantly apply themselves to the upper surface of the plank, and act in a direction opposite to the lifting tendency of the knife, to hold the board down to the bed where it belongs.

I can, therefore, see that if the material to be planed were heavy enough to weigh more than the cutters could lift, the pressure rollers, so far as their duty is declared, could in the horizontal machine be dispensed with, and then the combination of the claim would be broken; or, if the action of the cutter be so qualified as not to exert a lifting power upon the plank, then, of course, the pressure rollers would not be required for holding it down; or, if the action of the cutter could be so changed from lifting to pressing down, then the declared duty of the pressure rollers would be superseded; or, if the cutter could be so placed in relation to the bed and plank as to pull the plank down to the bed, then the pressure rollers might be dispensed with, and this last would be, in my judgment, the Norcross machine. The gauging bar which, in his machine, presses upon the top of the plank, is not involved in this comparison; for a board could be planed without it, if Woodworth

correctly states the operation of the cutter to be to draw the board towards its centre.

The office of the bar, which appears to be secondary to the operation of planing, is to gauge the depth of the cut. It cannot stand in the place of Woodworth's bed; for if that were removed his machine could not plane; neither can it perform the duty of the pressure rollers, for these are indispensable to the Woodworth machine. In a word, the difference between the Norcross gauging bar and the Woodworth pressure roller is this, the pressure rollers act upon the plank, the plank acts upon the gauging bar; the first is active, the second is passive. An illustration of the different relations of the parts in the two machines and their consequent different effects, may be found in the circular saw in common use. In this machine, the axis of the saw is below the bench, with the cutting teeth projecting above through a narrow opening; as the draft of the cutting teeth is downwards and towards the bench, no device for holding the work down is necessary, the workman lays the board upon the bench and presses it up to the teeth. Now imagine this saw hung with its axis above the bench, and revolving as it should the reverse direction, the necessity for providing a way to hold the board down accurs. The table is useless, unless means are employed for holding the board in contact therewith. So far as advantage or beneficial effect of such difference, as I have stated, is concerned, it appears to me that there cannot be much practical difference. I look upon them as two good ways of doing the same thing.

To the seventh interrogatory he says: He has the bench and cutters, in place of the bench, rollers, and cutters in the Woodworth machine; I have already answered the last part of this interrogatory.

To the eighth interrogatory he says: I answer, no.

To the ninth interrogatory he says: Referring to the combination of pressure rollers with revolving planes, I answer, no.

To the tenth interrogatory he says: Already answered in my reply to the sixth interrogatory.

To the eleventh interrogatory he says: There is a substantial difference; but in well made machines, I should consider one almost as good as the other.

To the twelfth interrogatory he says: The combinations are substantially different, for reasons given in my answer to the sixth interrogatory.

HENRY R. WORTHINGTON.

Subscribed and sworn before me, the 4th day of April, A. D. 1851.
WILLIAM DODGE, *Commissioner.*

Cross interrogatories.

To the first cross interrogatory he says: No.

To the second cross interrogatory he says: No.

To the third cross interrogatory he says: On the 21st March, 1851,

I examined what purported to be a certified copy of this patent, on which I have written my name. It is marked exhibit A, by the commissioner.

To the fourth cross interrogatory he says: On the 21st March, 1851, I examined the drawings annexed to the patent referred to in my last answer, said drawings being annexed to exhibit A.

To the fifth cross interrogatory he says: I have never seen any model or original Woodworth machine.

To the sixth cross interrogatory he says: I can find the rotating planes in the old drawing, and a set of rollers. These rollers are marked *f, f*, in the drawings, appended to exhibit A. They are not represented as pressure rollers.

To the seventh cross interrogatory he says: I have answered this in my answer to the fifth.

To the eighth cross interrogatory he says: All these means of making the comparison are not within my knowledge and command. A valuable opinion as to the reissue might be deduced from the drawings and specifications alone. So far as it related to originality, in view of Roguin's, Manneville's, and Muir's antecedent patents, but if the question of its propriety should depend upon the question whether Woodworth's old machine comprehended pressure rollers, combined with rotating planes, it would not, in my judgment, be safe to speak positively, without an inspection of his original model or machine.

To the ninth cross interrogatory he says: To reduce a board to equal thickness is one of the purposes stated in the original Woodworth patent. I cannot point out any practical mode of doing this without producing pressure on that side of the board which is to be planed.

To the tenth cross interrogatory he says: I do. It could not, for the obvious reason that otherwise the roller would bind upon the thick places, or be out of contact in the thin.

To the eleventh cross interrogatory he says: I have seen what purported to be authenticated copies of said patents, on which I have written my name; they are marked exhibit C, by the commissioner. I have relied for my information upon the translations of these French patents, on which I have written my name; that of Roguin is marked exhibit D, by the commissioner; that of De Manneville is marked exhibit E.

To the twelfth cross interrogatory he says: I have no knowledge on the point referred to.

To the thirteenth cross interrogatory he says: In my answer to the third direct question I have noticed the points of similarity between the Woodworth and French patents, and quoted the words of each in proof.

To the fourteenth cross interrogatory he says: An answer to the first part of this interrogatory will be found in my answer to the fourth direct interrogatory. The words of Roguin's specification pertaining to the guide bar are as follows: "*L*, cross bar of wood or iron called the

guide." "We have seen in the description of the first machine that the piece called the guide, (because it serves effectively to guide the wood under the tool for grooving, tongueing, and moulding,) was fixed in the superstructure of the bench; in the new machine this piece is borne by the carriage." The plank is held to and secured at both ends to the carriage, at one end by a claw like that of a carpenter's bench, at the other by a similar claw held down by a bridle or clamp. He describes his cutters as planes which "are cylindrical," "the blades being cut out of the thickness of the iron." "They are shaped obliquely." It might appear from this description that they were formed out of a solid block of metal, but the description is not sufficiently full to enable me to decide. There is nothing described as passing over the surface of the plank save the guide *L*. I have had no practical experience with planing machines, but for any difficulty stated in the specifications I should think the Roguin's machine might have worked well with the guide bar made self adjusting. In Roguin's patent of 1818 I find these words: "It is necessary that this carriage should be of sufficient weight so as not to be raised by the strain of the tool." 200 pounds might answer for light work, but he asks for 241 pounds.

To the fifteenth cross interrogatory he says: My answer to the fourth direct interrogatory refers only to Roguin's machine. The board about to be grooved is securely adjusted on a carriage. The words of the specification quoted in my answer to the third direct interrogatory explains all that I know of the De Manneville pressure rolls or of their arrangement. In my answer to the last cross interrogatory I have expressed my opinion of a single pressure roll. I have not examined the different plans for tongueing.

To the sixteenth cross interrogatory he says: De Manneville says that the board to be grooved is previously fixed in a carriage, driving between two conductors, which allow it no variation in any way. The rolls would, therefore, seem to have nothing to do with preventing lateral motion, although their downward pressure would tend to resist motion in any and every direction.

To the seventeenth cross interrogatory he says: I can understand some part of the description of Manneville's patent. After describing the steelyard arrangement of pressure rollers, he says: "The application of any other system of weights may be equally adopted; I have myself made use of another in one of my tables, where I enclosed all the mechanism in a cylinder of 18 inches diameter merely." The expression, "whole mechanism," may naturally refer to the whole mechanism for making pressure.

To the eighteenth cross interrogatory he says: *He says* "two fluted cylinders, vertically placed parallel to each other, press the board on both sides;" therefore, they are not applied to the edges. The edge of the board appears to pass over rollers beneath it, whose axes must of course be parallel.

To the nineteenth cross interrogatory he says: I do not altogether understand their construction and mode of operation.

To the twentieth cross interrogatory he says: I do not find the combination referred to.

To the twenty-first cross interrogatory he says: There is a reference to the operation of planing in the latter part of the "addition" where he speaks of a spring. All the rest refers to the operation of grooving. The dogs or bolts do project above the face of the plank, but do not interfere with the cutters which are working upon the edges of the plank.

To the twenty-second cross interrogatory he says: I have not so stated without qualification.

To the twenty-third cross interrogatory he says: I deduced the effect of the rotary cutter upon the plank from Woodworth's description, having no practical knowledge of the operation. He says nothing about vibration, and explains no provision for guarding against it. In practice the gauged bar of the Norcross machine is pressed or rather pulled firmly against the top side of the plank. This I look upon as an incidental effect, and not the object of contrivance. Its legitimate office is to secure the reduction of the board to an equal thickness.

To the twenty-fourth cross interrogatory he says: In the Woodworth machine, when the plank is being planed on one side, the other side is held firmly against a solid bed or rest, but not for the expressed or implied purpose of preventing vibration, as I can understand his specification. His pressure rollers press against the plank, and the plank is pressed against the bed, for the purpose set forth, of keeping the plank from being drawn up into the knives, and securing its reduction to an equal thickness.

To the twenty-fifth cross interrogatory he says: In both machines there are rotating cutters, and in both machines it is necessary that the plank should be close down upon the bed or rest. But as Norcross's arrangement obviates the tendency to displacement, there appears to be no necessity for any "mode of keeping it down," and I do not find any thing described for such purpose.

To the twenty-sixth cross interrogatory he says: This is the same in both machines.

To the twenty-seventh cross interrogatory he says: The substantial difference in mechanical arrangement and principle of action are set forth in my answer to the third direct interrogatory.

To the twenty-eighth cross interrogatory he says: The results of the two machines are, for all practical purposes, the same.

To the twenty-ninth cross interrogatory he says: Mr. Norcross claims as an improvement his plan for curving the board, so as to grasp the knots and close the fibres. The general arrangement of the machine would seem to be better adapted for supporting the board while under the action of the knife.

To the thirtieth cross interrogatory he says: The mechanical devices in the Norcross machine do suppose the necessity of feeding the boards

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to the cutter; they do not, of holding the board against a bed or rest, by any device for making pressure on the top side, whilst its opposite side is being planed.

To the thirty-first cross interrogatory he says: They do, of preventing the board from being drawn up by the operation of planing; they do, of planing and reducing to an equal thickness by the same operation; they do, of arranging the machine to admit boards of varying thickness; they do, of adjusting the cutter at a fixed distance, not from the bed or rest, but from the gauging bar. This adjustment is made for the purpose of determining this exact thickness. They do suppose the necessity of having the surfaces through which the plank passes vary in their distance, and of having the distance self-adapting, not by pressure, but by the action of the board upon the gauging bar.

To the thirty-second cross interrogatory he says: I have not spoken much of the principles of the two machines. Woodworth claims as his invention a new combination of old things; such a claim is restrictive, and does not allow of much scope in the way of analogous devices.

The principle of his combination is, the idea of holding a board down to a surface, from which, under the action of a rotary cutter, it seeks to rise. And he has shown a mechanical embodiment of his idea. If, by "analogous device," I am to understand anything which, being put in the same place, will do the same thing, then the employment of such a device would not change the principle of a combination. But the term is too general for accurate reasoning; an obvious, though oftentimes a very remote analogy, pervades all machines, as all are based upon a few general principles.

To the thirty-third cross interrogatory he says: I have been a student of mechanics for the last thirteen years; I have been one of the proprietors of a machine shop for the last six years, during which time I have been constantly employed in devising and constructing steam machinery. I have testified but once before, as an expert.

To the thirty-fourth cross interrogatory he says: I have not.

To the thirty-fifth cross interrogatory he says: I have answered in reply to the thirty-second cross interrogatory.

To the thirty-sixth cross interrogatory he says: An answer to this may be deduced from my preceding answers.

To the thirty-seventh cross interrogatory he says: The "mere inventing" of a machine constitutes nothing that I can express, except an invention. I should not so consider it.

To the thirty-eighth cross interrogatory he says: In my answer to the thirty-second cross interrogatory, I have defined the principle of Woodworth's combination to be the idea of holding a board down to a surface, from which, under the action of a rotary cutter, it seeks to rise. In the suppositional machine I see no such principle. To constitute a genuine Woodworth machine, the self-adjusting pressure must be upon the side of the plank upon which the cutters are at work, and the bed upon the opposite side must be a stationary point or plane for receiving that pressure.

To the thirty-ninth cross interrogatory he says: I have not so stated.

To the fortieth cross interrogatory he says: I am not engaged in any other way than as witness in the present case.

To the forty-first cross interrogatory he says: I have not.

HENRY R. WORTHINGTON.

Subscribed and sworn before me, the fourth day of April, A. D. 1851. WILLIAM DODGE, *Commissioner*.

Deposition of Henry R. Dunham.

Henry Dunham, a witness produced, sworn, and examined on the part of the respondents, deposes as follows:

To the first interrogatory he says: I am forty-two years of age; reside in the city of New York; I am an engineer and machinist, and been such about twenty-five years; I have been thus accustomed to examine and compare machines and patents, with a view to their novelty and identity, and have been frequently examined in patent cases as an expert; I am proprietor of the Archimedes works in this city, and established for about 18 years as a master mechanic.

To the second interrogatory he says: I am acquainted with the patent to Woodworth, and the reissue of it. The reissue does not describe the same invention as the original patent. The new patent is not of the same invention as the old one. My opinion and reasons are as follows: In the original patent no provision is made, by means of a self-acting or graduating pressure by rollers, to prevent the plank being planed to chatter against the knives when in operation. In the reissue the patent appears to be amended by the introduction of rollers, which are made to press uniformly against the planks or boards being planed, and which further prevents the action of the cutters from drawing the plank or board up to the cutting edge of the knives, thereby enabling better work to be done by the amended or reissued patent than could possibly have been done without these pressure rollers, which were omitted in the first patent. This is the great and leading difference between the original and the reissued patents.

To the third interrogatory he says: I have examined the Roguin patent and addition, and also the Manneville patent and addition mentioned. I never saw the book mentioned, that I know of. I find in the Roguin patent the combination of the cross bar or guide, in connexion with the cutting edges of the knives, the same as in the original Woodworth patent. In the Manneville I find the pressure rollers, in combination with the cutting edges of the knives, the same as in the Woodworth reissue. The above are substantially the same in the French and the Woodworth machines as stated. The Manneville and original Woodworth are the same in their mode of operation, so far as the carriage on which the planks were laid by reciprocating beds. The Woodworth original and the Roguin were quite similar in that respect.

To the fourth interrogatory he says: Manneville's has not such planes, in combination with rollers, to keep the board in place substantially the same as Woodworth's reissue.

To the fifth interrogatory he says: He could make a machine from the French patents, similar in effect and principle to the Woodworth machine, without invention. The whole generally, and the cutting knives and pressure rollers particularly.

To the sixth interrogatory he says: I am acquainted with the Norcross patent, and have examined a machine made from it; and also with the reissued Woodworth, and a machine made according thereto. The Norcross machine is substantially different in structure, principle, and mode of operation from the Woodworth machine. In the Norcross, the cutting cylinder is under the table or bed of the machine; over which the board or plank to be planed is passed. This is one important difference. The next and greater difference, in my opinion, is, that the guide or gauge presses the plank to be planed against the edges of the knives, while Woodworth's patent presses by the pressure rollers the board from the knives. In Norcross machine the cutting cylinder and guide or gauge being in a swinging frame, said frame being under the table, while in Woodworth's patents, the cutting cylinder is in a fixed frame above the table, and, by consequence, above the board or plank to be planed.

The advantage or beneficial effect of this difference in favor of Norcross, in my opinion, is that thinner boards can be planed smoother than in Woodworth's, the vibration being entirely provided against and overcome in the Norcross machine. In the Woodworth there must, from the distance between the pressure rollers and under the cutting cylinders, be always considerable vibration in thin stuff or boards.

To the seventh interrogatory he says: It has the guide bar or gauge above the board. It is substantially different from the rollers in Woodworth's machine for the same purpose.

To the eighth interrogatory he says: It has none, and no analogous device. It has a rotating plane without rollers.

To the ninth interrogatory he says: It has not.

To the tenth interrogatory he says: In the Norcross machine, the bed; in the Woodworth machine, the rollers.

To the eleventh interrogatory he says: There is such a substituted difference in the Norcross machine; the bench used by Norcross is the best, because of the immediate and direct pressure of the plank being planed over the cutting edges of the cylinder, thereby effectually destroying all vibration in the board during the planing.

To the twelfth interrogatory he says: It is substantially different in structure and mode of operation, from the important feature of the board being held steady and firm over the cutting cylinder, while passing over the bed of the machine. HENRY R. DUNHAM.

Subscribed and sworn before me, the fourth day of April, A. D. 1851. WILLIAM DODGE,
Commissioner.

Cross interrogatories.

To the first interrogatory he says: I have. I cannot state, certainly, more than once, about three or four years ago. In writing, before a commissioner; written down by him.

To the second cross interrogatory he says: I have not; the testimony I gave was, I think, to be used in a suit; given at the request, I think, of Pendleton & Leach; part in presence of James G. Wilson.

To the third cross interrogatory he says: The first one I examined appears to be duly certified as a true copy by the Patent office. I did not affix any mark on it. The last one I saw, is the one on which I now write my name, and is an exhibit hereto, A.

To the fourth cross interrogatory he says: The first one I examined appeared to be a duly certified copy. I do not recollect whether I marked it. The last one I saw, is now before , exhibit A.

To the fifth cross interrogatory he says: My opinion is formed from the original machine, as set in operation and used on the premises of the Dry Dock company, I think in the year 1829, or thereabouts. Mr. Woodworth, whom I knew very well, was there at the time I saw the machine; he explained it and pointed it out to me as one of his original machines; it was then in operation, it worked badly; it had been in operation some few months when I saw it. Mr. Woodworth, also, subsequently explained the whole invention to me. I did a great deal of business with him after; he told me his invention consisted simply of the cylinder and cutting knives, as used in the machine I saw, and from which machine the boards came very imperfectly and roughly planed, which imperfection and difficulty, he told me, in 1835, he obviated by the use of pressure rollers; there were no pressure rollers in the original machine, similar to those used at the time mentioned, 1835. I had frequent and constant communication with him, in business matters; we frequently discussed his machine, and the improvements upon it from the time it was invented by him. He told me he could not do good smooth work with it until he introduced the uniform pressure rollers; he told me, and I knew from my own observation, that his machine, in 1835, was an entirely different machine and invention from his original invention. I do not know who made the machine.

To the sixth cross interrogatory he says: The devices in combination, as appears to me now from the drawings of the original machine which I have marked, and which I saw in the original machine, were the cutting cylinder and the moving bed. These are claimed also in the reissued letters patent; these are the only things common to both.

To the seventh cross interrogatory he says: The only devices in combination as inquired about, claimed in the reissue, found in the original machine, are those I have stated in my last answer. I never saw the model filed in the Patent office, and cannot answer about it. I cannot answer further to this question than I have answered above.

To the eighth cross interrogatory he says: I find in the reissue the uniform pressure rollers, operated by means of weights or springs; that

was not in the original machine I saw, nor in the drawing of the original patent, or claimed in the description of the original patent.

The original patent did not contain such rollers operated as I have stated; they are new in the reissue, and so Mr. Woodworth himself told me, that they were invented after the original patent was taken out. I have had every opportunity, from observation, acquaintance with the machine and its inventor, and from examination of the drawings and subsequent description, to give what I deem a correct opinion. I would attach great credit and value to the opinion of an experienced expert, accustomed to consider, design, and proportion machinery, made up without having all the means suggested before him, provided he had the model, or a correct description of the machine, or a correct drawing.

To the ninth cross interrogatory he says: One of the purposes stated is to reduce to an equal thickness. I can point out a mode without pressure rollers, and would refer to the mode in Norcross's machine.

To the tenth cross interrogatory he says: I do; the machine could work, but with difficulty, as the rollers were arranged and secured in the original machine; they were fixed rollers; difficult because of the fixed rollers and the varying thickness of the material to be planed.

To the eleventh cross interrogatory he says: I never saw the original patents; I have seen what I have no doubt were authenticated copies, they are marked exhibit C, and I put my name on them. I have also put my name on the translations thereof, marked exhibits D and E. I have not seen the work entitled Brevets d'Inventions. I do not read the French language, but have relied on the translations.

To the twelfth cross interrogatory he says: I have no knowledge.

To the thirteenth cross interrogatory he says: In answer to this I would refer to my former answer to the third interrogatory.

To the fourteenth cross interrogatory he says: The words are "L, cross bar of wood or iron called the guide." "We have seen in the description of the first machine that the piece called guide (because it serves effectually to guide the wood under the tool for grooving, tongueing, and moulding) was fixed in the superstructure of the bench. In the new machine this piece is borne by the carriage."

The plank is held by dogs or clamps; the cylinder is formed with cutting edges and out of a solid block, the edges being formed by fluting the cylinder; I would not call it a burr cutter; there is nothing described as passing over the surface of the plank, only the guide L. I find nothing to vary this while in operation, but it can be varied to suit any varying thickness of plank, in this respect performing the same office that the rollers did to Woodworth's original machine. I only find it on one side; I do not think it would answer a good practical purpose, as arranged in Roguin's machine.

I do find rotating planes in the patent of 1818; there is no pressure roller described. I find a cross piece in the drawing, but do not find that it is made self-adapting; it seems permanently attached, and the carriage is to weigh about 200 pounds. I think a machine could be

made to work on this plan. I think that would be weight enough, depending on the rapidity of work, if they did not feed too fast. If they did yield, they would yield together and work the plank irregular.

To the fifteenth cross interrogatory he says: I have not so stated. It is so stated that the plank is to be well fixed in a carriage; the pressure roller is not used in connexion with holding the plank to the carriage; the roller is to be applied to the face of the plank. It is practicable, because it serves to press the board against the bed while in the act of being planed. I think one roller could be made practically useful. The mode of tongueing is by means of circular saws, five for tongue and three for groove, with reciprocating cutter for finishing the groove. It is not substantially similar to Woodworth's in the cutting edges of the tools, one being by saws, the other by cutters; in other respects the same.

To the sixteenth cross interrogatory he says: I think it would; the pressure roller the same as in Woodworth's machine.

To the seventeenth cross interrogatory he says: I do understand it. I understand the mode of construction in reference to the cylinder of 18 inches to mean a small working model, a particular description of which was never intended to be explained in connexion with the specification in which it is found.

To the eighteenth cross interrogatory he says: I understand that the fluted cylinders are applied to the faces or sides of the plank to be planed. The plank is to be placed on rollers that are horizontal; there are friction rollers, serving to sustain the plank. The two fluted rollers are vertical, and are the pressure rollers, similar to those in Woodworth's reissue. The fluted rollers are not applied to the edges of the plank.

To the nineteenth cross interrogatory he says: I do not fully.

To the twentieth cross interrogatory he says: I do not.

To the twenty-first cross interrogatory he says: It does not apply solely to a mode of feeding. I do not find any modification of the roller for taking the warps out of the planks, but the plank is not secured to the links of the chain. I do not find any dogs or bolts projecting above the surface of the plank. I find holdfasts alluded to, but they are in connexion with tongueing and grooving. I do not understand that the roller is grooved for the purpose of admitting of the passage of such projecting bolts, nor do I find any bolts projecting, making it necessary.

To the twenty-second cross interrogatory he says: From both. It would depend upon the intelligence and versatility of the mechanic.

To the twenty-third cross interrogatory he says: The plank is held down to the bed by the gauge and by the action of the cutters; the plank is pressed down to the knife. This pressure does prevent vibration, and secures the reduction of the board to an equal thickness.

To the twenty-fourth cross interrogatory he says: In the Woodworth machine the plank is held against a solid bed or rest, but I do not think firm enough to prevent all vibration taking place whilst under the

action of the knife, because in this case it is passed from the cutting edges of the knives, being the converse of Norcross, and the pressure applied thereto by the rollers being more remote from the cutting edges of the knives than in the Norcross machine, where the pressure is immediately over the knives, as before stated.

To the twenty-fifth cross interrogatory he says: In both machines there are rotary cutters. In the Woodworth, the mode of keeping the plank in contact with the bed is by rollers pressing it from the cutters. In the Norcross, by a guide or gauge pressing the plank down to the cutters and the bed; either plan reduces plank to an equal thickness.

To the twenty-sixth cross interrogatory he says: Yes.

To the twenty-seventh cross interrogatory he says: I refer to my answer to the twenty-fifth.

To the twenty-eighth cross interrogatory he says: I have not been able to compare the results, but my judgment is, that on thin stuff the Norcross would do smoother work; it is from a change in principle; that principle is, that in the Norcross machine, the gauge being immediately over the knife, entirely destroys all vibration in the stuff while being planed.

To the twenty-ninth cross interrogatory he says: It does; by the introduction of the pressure gauge immediately above, and pressing down on the cutting knives, introduces a new principle, and produces a superior quality of work from the steadiness of its action.

To the thirtieth cross interrogatory he says: It does require the feeding. It does not suppose any necessity of being held firmly against a bed or rest while its opposite side is being planed, nor of preventing the board from being drawn to the cutter, but the contrary; it does plane and reduce to an equal thickness at one operation; also, of arranging the machine, as stated in the question. I call the bed or rest the part on the same side with the cutters, and the part on the opposite side of the plank the gauge or guide. There is no necessity of adjusting the bed or rest to determine the thickness of the plank after being planed; the adjustment lies between the guide and the cutter; the distance between the guide and the bed would vary, but not the distance between the guide and the cutters; these varying distances are self-adapting.

To the thirty-second cross interrogatory he says: The principle of a machine is the mode, the means and operation, by which the end sought is attained. The use of an analogous device does not change it, but a mechanical equivalent would change it.

To the thirty-third cross interrogatory he says: I have been a machinist almost twenty-five years, and have spent all that time in acquiring such knowledge. I have had a good knowledge of it twenty-three years, and deem myself an expert for that time. I have been all that time a practical mechanic in machinery and steam engines the whole time.

To the thirty-fourth cross interrogatory he says: I do not recollect.

To the thirty-fifth cross interrogatory he says: I regard as the principles that by which a board is attempted to be held down to a bed, to

prevent its rising against the cutters, while passing under them to be planed.

To the thirty-sixth cross interrogatory he says: Passing a board under rotary cutters and under rollers, which prevents its rising against the cutters in its passage during the operation of planing, said board passing over a stationary bed in all cases.

To the thirty-seventh cross interrogatory he says: Not if such principles, or modes of operation, were before known. I should not consider the substitution as constituting an essential change in principle, or mode of operation, all else remaining the same.

To the thirty-eighth cross interrogatory he says: I should think that it would be a change in principle and mode of operation.

To the thirty-ninth cross interrogatory he says: I have not so stated.

To the fortieth cross interrogatory he says: I am not.

To the forty-first cross interrogatory he says: I have not.

HENRY R. DUNHAM.

Subscribed and sworn before me, the 4th day of April, A. D. 1851.

WILLIAM DODGE, *Commissioner.*

Deposition of John Ericsson.

John Ericsson, a witness, produced, sworn, and examined, on the part of the respondents, deposes and says:

To the first interrogatory he says: My age is forty seven, my residence the city of New York, my occupation a civil and mechanical engineer, in which I have been engaged upwards of thirty years last past. I have had great experience in examining and comparing machinery of every description, and have been accustomed to examine patents and machines with a view to their novelty and identity, and I have been examined in patent cases as an expert.

To the second interrogatory he says: I am acquainted with the patent, and its specification and drawings, granted to William Woodworth, December 27, 1828, for an improved planing machine, and with the reissued patent granted to William W. Woodworth, with an amended specification, on the 8th of July, 1845. The said reissued patent does not, in my opinion, describe the same invention as the original patent. The new patent, in my opinion, is not for the same invention as the old one. The first patent was issued, as I understand it, (if we exclude circular saws for reducing boards to a width,) for certain improvements in constructing the planing cylinders, and for tongueing and grooving. There is no combination of this cylinder, or of these cutters with pressure rollers, described or claimed in the specification or drawing annexed to Woodworth's original patent. The reissued patent was granted for this combination. I therefore consider the two patents as issued for substantially different machines.

To the third interrogatory he says: I am sufficiently acquainted with the patents granted to Roguin and Manneville. The machine

described by Roguin, in his patent of 1817, combined a planing cylinder, substantially like that described by Woodworth, with a carriage, and cross bar to hold the board down while being planed. The parts thus combined, and the mode in which they were combined, were substantially the same as are described in the specification and drawings annexed to Woodworth's patent of 1828. The machine described by Roguin, in his patent of 1817, is also substantially like the modification of the Woodworth machine, described in his reissued patent of 1845, in which a carriage is to be used. The only difference being, that Woodworth there describes pressure rollers to hold down the board while being planed, though I am of the opinion that any skilful mechanic would have so constructed the cross bar described by Roguin as to have made it a yielding pressure bar. In the machine for planing, described by Manneville, reciprocating planes, combined with feeding rollers, were used, and one of these planes, as it passed over the surface of the board, described the segment of a circle. In the machine described by him for tongueing and grooving, circular saws in combination with a pressure roller or rollers, were used, and this combination of rollers with saws was substantially the same combination as the combination of cutters for tongueing and grooving, described by Woodworth

To the fourth interrogatory he says: The machine described by Roguin had a rotating plane in combination with a cross bar to keep the board in place. I considered the combination of this cross bar with the rotating plane, substantially the same as the combination of the rotating plane with the rollers, as described by Woodworth.

To the fifth interrogatory he says: I think, with the aid of the French patents, a mechanic skilled in planing machines could make the Woodworth machine by simply substituting cutters for tongueing and grooving, in the place of the saws described by Manneville.

To the sixth interrogatory he says: I am acquainted with the patent granted to Norcross on the 12th of February, 1828, for an improved planing machine. I have seen such machine in operation, and I have also examined a model thereof. I am acquainted with the reissued Woodworth patent, but not with any model or machine made according thereto. The Norcross machine is in some material respects different in structure, principle, and mode of operation, from the Woodworth machine. The Woodworth machine is composed of a bed or bench, across which is hung the planing cylinder, revolving with its periphery such a distance above the top of the bench as to determine the thickness of the board or plank to be planed. The knives of the cylinder, as they revolve, tend to lift the boards into their edges, and the invention of Woodworth, as claimed in the reissued patent before mentioned, was so to arrange the pressure rollers as to prevent these knives from lifting up the board, as they cut from its planed to its unplaned surface.

In the Norcross, the cylinder is hung below the bench; and by this arrangement, the combination of bench with cylinder is such, that the

knives thereof cannot draw the board into their edges. Hence the invention claimed by Woodworth was not required, nor could it be used in its combination. The mischief he remedied was the tendency of the knives to lift the board from the bench. This mischief, from the very nature of the combination adopted by Norcross, could not exist. He was compelled to devise some means by which he could reduce the board from an unequal to an equal thickness, and this he accomplished by the judicious contrivance of hanging the cylinder, and fixing a rest, in a frame, moving within another frame, in such a manner, that this rest hanging upon the board, rises and falls in perfect adaptation, to its varying surface. By this method, the cylinder in the Norcross machine, cuts against an unyielding bed; and in this respect is, in my judgment, superior to the Woodworth machine. I, therefore, regard the invention of Woodworth and of Norcross as substantially different. The former, as claimed by him, contrived the means of preventing the board from being drawn into the knives. The latter, constructed a machine requiring no contrivance for counteracting that tendency.

To the seventh interrogatory he says: The means employed in the Norcross machine for keeping the board in place while being planed, are the rest, cylinder, and moveable frames. These are substantially different in structure and mode of operation from the rollers used in the Woodworth machine.

To the eighth interrogatory he says: It has not.

To the ninth interrogatory he says: It has not.

To the tenth interrogatory he says: In the Woodworth machine, the pressure rollers. In the Norcross machine, the bed or bench.

To the eleventh interrogatory he says: There is a substantial difference; and, in my opinion, the bench is the best, because the most firm, and the best calculated to keep the board steady, while being planed.

To the twelfth interrogatory he says: The combination is substantially different; the bench or bed of the Norcross machine is entirely different from the pressure rollers in the Woodworth machine. The office performed by each is dissimilar. The bed is firm and unyielding. The rollers are yielding. It would be absurd to contend that the bench of the Woodworth machine would become a pressure roller, by hanging the axis of the planing cylinder below it.

J. ERICSSON.

Sworn, examined, and subscribed before me, on the 4th day of April, A. D. 1851.

WILLIAM DODGE, *Commissioner.*

Cross interrogatories.

To the first cross interrogatory he says: I have before testified, before a court, in causes in court, in legal proceedings under the patent

laws; but I do not know that I ever testified or made an affidavit, in connexion with any application for legal proceedings under that law; nor do I know what is meant by the phrase "application for legal proceedings." I have not, in such testimony, given my opinions on questions of originality, or novelty, or infringement, in connexion with the Woodworth patent. I do not recollect how many times, or at what dates, I have testified or given affidavits in court; but I have never so testified or given affidavits concerning the Woodworth patent.

To the second cross interrogatory he says: I have never given any affidavits upon the subject of the Woodworth patent, inquired of.

To the third cross interrogatory he says: I have examined no document as the original patent and specification of William Woodworth, but I have examined a certified copy thereof from the Patent office. I cannot state when I first examined it, but I last examined it a few days ago. I have no particular mark or means of recognising the identity thereof. It is now before me. I mark my name on it; it is exhibit A.

To the fourth cross interrogatory he says: I have examined a copy of the drawings annexed to the letters patent of Woodworth of 1828, as stated by me in my last preceding answer, and no other document containing such drawing.

To the fifth cross interrogatory he says: I have formed my opinion in whole, respecting the reissued patent granted to William Woodworth, from said copy, specification, and drawings, and not from any model of the original, or from having seen the original machine.

To the sixth cross interrogatory he says: I do not find either of the combinations claimed in the reissued patent, except the planing cylinder and cutters, for tongueing and grooving, in the drawing annexed to the original patent, unless I imagine the rollers shown in the drawing to be pressure rollers. I have not a copy of said drawings, and can only designate the same by marking the certified copy of the specification and drawings I have before referred to, with my name; they are marked by the commissioner exhibit A.

To the seventh cross interrogatory he says: I never saw an original machine of said Woodworth before the year 1829. I never saw any model of the machine by Woodworth filed in the Patent office. I never made a model from the original machine of Woodworth; nor did I ever compare any model with the original machines mentioned in the question.

To the eighth cross interrogatory he says: I am unable to find either of the combinations in the copy of the drawings of the patent of 1828, which are claimed by said Woodworth in his reissued letters patent, except the planing cylinder and cutters for tongueing and grooving. The devices which I find in the original letters patent, and which I also find in the reissued letters patent, are the cutter wheels for planing, tongueing, and grooving. These are described in both specifications. The combination of the same with pressure rollers I do not find in the specification of 1828. I attach much credit and value to opinions on

the reissue, deliberately formed from an examination of copies of the original specification and drawing.

To the ninth cross interrogatory he says: One of the purposes stated in the original patent of Woodworth is to reduce boards and plank to an equal thickness. The best means for accomplishing this purpose, in connexion with a planing cylinder placed over the bench, as in the Woodworth machine, is by pressure rollers; but I think it possible to confine the board to a carriage by pressure upon the edges of the plank by clamps, or otherwise, in connexion, perhaps, with dogs, and an unyielding roller or guide extending across the surface of the planed part of the board. These means of confining the board to the carriage would, however, be much inferior to the pressure rollers.

To the tenth cross interrogatory he says: I do find in the drawings of the Woodworth patent of 1828, the representation of rollers on each side of the planing cylinder, one of which is on that face of the plank to be planed. The plank may have been planed without making these rollers self-adapting, but not successfully. I repeat, however, that the most efficient means for holding the plank would have been to make the roller under which the plank was to be passed to the cylinder self-adapting.

To the eleventh cross interrogatory he says: My examination of the specifications and drawings of the French machines referred to in this interrogatory was made from the drawings annexed to what was said to be the deposition of Antoine Perpigna, taken in France, in this cause, and from translations into English of the specifications said to be annexed to such depositions. I have looked at the work referred to in this interrogatory. The date I do not recollect, and have relied for the opinions I have formed upon said drawings and translations. I have no knowledge of the dates of said French patents, except what I have acquired from said translations and the said printed work. The drawings are marked exhibit C, the translations exhibits D and E, and on which I write my name.

To the twelfth cross interrogatory he says: I have no knowledge of the date when said work was published, except from the date on the title page thereof.

To the thirteenth cross interrogatory he says: I find the same combination of the planing cylinder, with an equivalent for a roller to hold the board down to the bed of the machine, in Roguin's first machine, patented, as I am informed, in 1817, as I find in the Woodworth machine of 1845, if the bar L is made yielding, as a competent mechanic would construct it. I also find the combination of saws and tools for tongueing and grooving, with a pressure roller for holding the board firmly down to the bed of the machine, in Manneville's description of his invention, patented, as I am informed, in 1825. This combination of saws, with a pressure roller for tongueing and grooving, is substantially the same combination as the pressure rollers with cutters for tongueing and grooving described by Woodworth in his reissued patent. The substitution of cutters in the place of saws,

both tools being old and well known in 1828, would, in my judgment hardly amount to an invention, as it would really require no invention to remove the saws and place cutters in their stead.

To the fourteenth cross interrogatory he says: I find in the specification and drawings of Roguin's machine, his first and second machines, a description of cylindrical planes. I cannot, at this moment, give the words of the French patent of 1817, which describe the combination of the cylindrical planes with the device analogous to the pressure roller, as I have not said French patent by me; but upon examining such specification and drawings, it will be found that the cylindrical plane was combined with a bar, marked L, in the drawing annexed to said French deposition, placed across the board upon that side of the rotary cutter on which the board to be planed was to be first presented. This bar must of necessity have been yielding, and no one, not devoid of mechanical knowledge, would have made it rigid. I do find in the French machine of 1817, that the board is secured to the carriage, by what are ordinarily called dogs. The rotating instrument in Roguin's first machine, for reducing the face of the plank, is armed with knives or cutting edges, let into or formed out of the solid metal. This planing cylinder is not what is known in mechanics as the burr cutter. The burr cutter is formed with teeth, and is not designed for planing wood, and this fact is well known to mechanics. The cutter described by Roguin, in his patent of 1817, was a planing instrument provided with knives, or cutters, capable of reducing and planing to a smooth surface, boards and planks. This instrument was undoubtedly inferior to that described by him in his patent of 1818, which appears to me to be as well adapted to planing wood as any which has been since made. I do not, in Roguin's patent of 1817, find any thing described or represented as resting upon the surface of the plank other than the cross piece marked as before stated. I do not find any mode for holding down or making the cross bar yielding, particularly described in the specification, but I find at each end of the cross bar, in the drawing, a thumb screw represented, which said cross piece is held down, and as its length is upwards of four times the width of the board to be planed, and as it is of very slight dimensions, it will yield sufficiently to accommodate itself to the varying thickness of the board. I do not find any guide or cross piece on both sides of the rotating cutters. I should not think a board would be held firmly down with one cross piece, so as to answer a good practical purpose, but it would not be necessary to have a pressure roller over that part of the board which had been planed, as an unyielding roller, fixed upon its axis, would be sufficient to prevent the board from being drawn up by the cutters. I do not, in the patent to Roguin of March, 1818, find rotating planes combined with a pressure bar, or its equivalent. In this machine, the only guide, or cross piece, I perceive, if it may be so called, is attached to the carriage, in which the planing cylinder moves from end to end of the plank; and it is, I believe, stated that this carriage is to weigh about two hundred and fifty pounds, or be heavy enough not to be raised. I think a prac-

tical working machine could be made on this plan. Whether the weight of two hundred and fifty pounds would be sufficient to hold down the planing cylinder, I do not know; but if this weight be not sufficient, it would, of course, by any competent mechanic, be increased sufficiently for the purpose. If the guide and planing cylinder were connected, as supposed in the question, they would, if one yielded, yield together.

To the fifteenth cross interrogatory he says: I do not in either of Manneville's specifications find a planing cylinder, but I do find described therein the combination of reciprocating planes, one of which in its motion describes the segment of a circle in combination with pressure rollers. It is in substance stated in Manneville's first patent, that the plank to be tongued and grooved is to be securely adjusted on a carriage. The pressure roller is to be used to secure and hold the plank firmly down upon this carriage. This roller is to be applied upon the upper side of the board, as in the Woodworth machine. Such a mode of application is, in my opinion, practicable, because such roller is calculated to hold the board firmly down upon the carriage, whilst the board is being tongued and grooved. I think such a machine for tongueing and grooving could be made practically useful with only one such pressure roller, without adopting any other plan for securing the plank to the carriage. It would be quite unnecessary, however, to adopt any other plan, as the description of one pressure roller to hold the board down would be quite suggestive of two, if another were necessary for the purpose. With the exception of the difference between the circular saws and cutters, as instruments, I do think the mode of tongueing and grooving, as described by Manneville, is the same substantially as Woodworth's plan. I do not think it would require much invention to substitute for the circular saws of Manneville, the circular cutters described by Woodworth. I give this opinion upon the assumption that both cutters and saws were old in 1828, and that the combination of them with pressure rollers is the invention claimed. This being so, I am unable to see what inventive skill was required to remove the saws used by Manneville, and replace them by circular cutters.

To the sixteenth cross interrogatory he says: In my opinion, the roller would prevent the plank from moving laterally in the Manneville machine, whilst being tongued and grooved. What is described to prevent this lateral motion is a device for bearing down with this roller upon the surface of the plank near the point where the operation of tongueing and grooving is to be performed together with guides.

To the seventeenth cross interrogatory he says: I have not so examined Manneville's specification as to be able to understand how he enclosed his entire mechanism in a cylinder of eighteen inches, if he intended so to declare.

To the eighteenth cross interrogatory he says: In the description of Manneville's machine, the fluted pressure rollers are not applied to the edges but to the sides of the plank. It is stated that the plank is placed on its edge,

on rollers, whose axes are horizontal. These rollers are evidently friction rollers only. It is also stated, that two fluted rollers which are vertical press the board on both sides. The fluted rollers are not, therefore, applied to the edge of the plank, but to the sides, by means of which it is fed through the machine.

To the nineteenth cross interrogatory he says: I do understand the construction and mode of operation of the planes. I have not examined the specifications of Manneville's planing machine, with a view to describing minutely the planes for planing the surface of the plank, or of constructing a diagram of the planes. These planes operate by a reciprocating motion, and it is quite clear from the description that one of the tool carriers or planes described by him, in its reciprocating movement, describes the segment of a circle, so that the planing is performed by a circular movement of the tool.

To the twentieth cross interrogatory he says: I do not find in either of Manneville's patents the combination of rotating planes with pressure rollers, for planing planks and reducing them to an equal thickness. There is no drawing, that I have ever seen, of the Manneville planing machine.

To the twenty-first cross interrogatory he says: I think the addition of said Manneville, bearing date April 28, 1825, does apply to a mode of moving the plank by means of an endless chain, forming, in fact, a carriage, or endless chain, upon which the board moves through the machine. It is possible, that the dogs or bolts for securing the plank to this endless chain, do project above the surface of the plank. This mode of securing and feeding the planks, however, is not adopted, as I understand its description, for the purpose of being applied to Manneville's planing machine, but to be applied solely to, and as an improvement upon, his machine for tongueing and grooving. Perhaps such a mode could not be applied to his planing machine for the reasons suggested in the question, nor can I discover any reason in the description for supposing that Manneville intended so to apply it.

To the twenty-second cross interrogatory he says: I think a mechanic, skilled in planing machines, could, without invention, other than substituting the roller for the bar, construct the Woodworth planing machine from the specification and drawings of the Roguin machine, and that this could be done by a mechanic having no more skill or knowledge of planing than was known at the time the said invention purports to have been made.

To the twenty-third cross interrogatory he says: In the Norcross machine, while the plank is being planed, the side upon which the plane acts is held firmly against the bed or bench of the machine by the pressure of the rest upon the opposite side of the board. The rest, by thus pressing down the board, does prevent it from vibrating whilst under the action of the knives, and the distance of this rest from the periphery of the planing cylinder does secure the reduction of the board to an equal thickness. It cannot be said with propriety that the board is held firmly against the rest, when, in fact, it is the pressure of

the rest, as I have before stated, which forces the board firmly against the solid bed or bench of the machine.

To the twenty-fourth cross interrogatory he says: In the Woodworth machine, when the plank is being planed on the one side, the other is, by the action of the pressue rollers, held against the solid bed or bench of the machine, and this does tend to prevent vibration. The reduction of the board to an equal thickness, in the Woodworth machine, is determined by the fixed distance of the cylinder from the top of the bed or bench, with which it is connected.

To the twenty-fifth cross interrogatory he says: There are in the Woodworth and in the Norcross machines, rotary cutters to plane the board, and in the Norcross machine there is a mode of keeping the plank in contact with the rest, to reduce it to an equal thickness. But there is no rest in the Woodworth machine corresponding to the rest in the Norcross machine, the plank in the Woodworth machine being held firmly against the bed or bench while it is being planed.

To the twenty-sixth cross interrogatory he says: The board in each machine is, by the rotary cutters, combined with other parts of the two machines, reduced to an equal thickness at the time that it is planed.

To the twenty-seventh cross interrogatory he says: The difference in the process by which the board is planed and reduced to an equal thickness in the two machines, is, that in the Woodworth machine a combination of rotary cutters with pressure rollers, or some analogous device, must be employed in the Woodworth, while in the Norcross machine no pressure rollers, or device analogous thereto, are employed.

To the twenty-eighth cross interrogatory he says: The difference in the result of the two machines evidently is, that the Norcross machine will plane much thinner stuff than can be planed in the Woodworth machine, and will plane all kinds of boards and planks, and particularly such as are cross grained and knotty, in a smoother and better manner. The difference between the two machines is a change in principle which exists in the Woodworth machine, which is not to be found in the Norcross machine. In the former is to be found the combination of a rotary cylinder, with pressure rollers to prevent the board from being drawn up by the cutters; while in the Norcross machine, no such combination, nor any substantially like it is found.

To the twenty-ninth cross interrogatory he says: The mechanical devices in the Norcross machine, do effect a new and useful change in the operation of planing boards. What new principle he has introduced, I shall define, by stating, what in substance, is his invention—First, he has combined the cylinder with the bed or bench of the machine, for planing substantially different from any previous combination. Before his invention, so far as my knowledge extends, a cutting cylinder had never been so combined with the bench or bed, as to rise and fall vertically upon its axis, during the operation of planing. This combination Norcross invented. Second, he so contrived and managed the rest, F, that it should rise and fall with the cylinder,

maintaining at the same time a fixed distance therefrom, for the purpose of gauging the thickness of the board to be planed; and he also curved his rest, that it might the more firmly hold, and the more advantageously present the board to be planed to the action of the planing cylinder. This is also a new combination. Third, he combined this cylinder and rest in a frame, so contrived within another, that both rest and cylinder should rise and fall together; and by a self-adjusting process, adapt themselves to the varying thicknesses of the board to be planed. This combination and arrangement is also entirely new; and these combinations and changes incontestibly do introduce a new and most important principle into the machinery for planing boards and plank, as it existed prior to the invention of Norcross.

To the thirtieth cross interrogatory he says: The mechanical devices in the Norcross machine are so combined as to substantially accomplish the purposes suggested in the question; but to say that the mechanical devices suppose the necessity of such accomplishment, is, to say the least, speaking inaccurately.

[There is no division, in the commission, between the 30th and 31st, and the witness answers them together.

WILLIAM DODGE, *Commissioner.*]

To the thirty-second cross interrogatory he says: The principle of a machine, as I define it, is its peculiar structure and constituent parts, by means of which, a given effect is produced; thus, if the same effect is produced by two machines, and their structure and constituent parts or combinations are substantially dissimilar, the machines are unlike in principle. If by the words "analogous device," as used in the question, mechanical equivalents are meant, the substitution of one mechanical equivalent for another, in a machine, does not change its principle.

To the thirty-third cross interrogatory he says: My means of acquiring an expert knowledge of machinery, consists in more than twenty-five years' experience, in the construction of steam machinery, and other machines of great variety. I have testified in courts of justice at various times, and also in the Houses of Lords and Commons, in England, as an expert. I have never been a working mechanic, if that is what is meant by a practical mechanic.

To the thirty-fourth cross interrogatory he says: I have not.

To the thirty-fifth cross interrogatory he says: I regard the combination of a cylindrical plane and cutters, with a bench and pressure rollers, so combined as to plane, tongue, and groove boards, as constituting the principle of the machine described in the Woodworth patent; but I do not regard this as the principle embodied in his alleged invention. The principle of his invention, as claimed by him, consists in combining with this cylindrical plane and cutters pressure rollers, so arranged as to hold the board firmly whilst being planed, tongued, and grooved. The principle of an entire machine may be quite different from the principle of that invention, by which it is merely im-

proved. Indeed, the principle of an invention, when applied to machinery, may be said to consist in what the inventor actually does, either in constructing a new machine, or in making improvements upon an old one, or in arranging new combinations of machinery. In all these cases the principle of his invention, is to be found only in that peculiar construction and arrangement which is useful and new, and substantially unlike any thing before known.

To the thirty-sixth cross interrogatory he says: The general mode of operation of the Woodworth machine is, that arrangement of its parts, by which as the board is forced over a bench, by feeding rollers, it is held firmly down by pressure rollers, and subjected to the action of a cylindrical plane and revolving cutters, which plane, tongue, and groove the board as it passes through the machine.

To the thirty-seventh cross interrogatory he says: I regard that branch of the question, whether I consider the mere invention of a machine to constitute a change of principle or mode of operation, as quite unintelligible. If the machine suggested in the question were new and useful, it would be unlike in principle and mode of operation what was before known. If, on the contrary, a person were to invent a machine which was actually known and used before, this would not constitute such a change of principle or mode of operation. If weighted, or yielding bars or plates, were substituted in the Woodworth machine for the pressure rollers, it would not, in my opinion, constitute a change in its principle or mode of operation; although they would not operate so advantageously as rollers.

To the thirty-eighth cross interrogatory he says: The proposition contained in the question involves an absurdity. For, if the pressure rollers are made stationary, and if the plane and bench are attached in a fixed relative position to each other, there will be no yielding in this supposed structure, to accommodate itself to the varying thickness of the plank; and if the bench and rotating plane so connected are both made yielding, the board will not be reduced to an uniform and particular thickness.

To the thirty-ninth cross interrogatory he says: My answer to the last question will sufficiently answer this.

To the fortieth cross interrogatory he says: I am not engaged as attorney or counsel for the defendants, or either of them, or for any other person in this or any other cause, matter, or proceeding whatever.

To the forty-first cross interrogatory he says: I have not been consulted or employed as attorney, counsel, or adviser by Nicholas G. Norcross on any question of infringement or otherwise, nor shall I receive any compensation whatever from it.

J. ERICSSON.

Subscribed and sworn before me, on the 4th day of April, A. D. 1851.

WILLIAM DODGE, *Commissioner.*

UNITED STATES OF AMERICA,
Massachusetts district, ss.

[L. S.] The circuit court of the United States, within and for the Massachusetts district.

To Henry S. Sanford, esquire, secretary of legation, Paris; or, if absent, Robert Walsh, esquire, Paris.

Know ye, that reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed of Monsieur A. Perpigna, residing at No. 10, Rue Neuve St. Augustine, in Paris; a witness to be examined on behalf of the respondents, and to be used in a certain cause now pending in said court, wherein Artemas L. Brooks and others, complainants, in equity, versus John Fiske and another, respondents.

And to this end, at certain days to be by you appointed for that purpose, to cause said witness, as aforesaid, to be brought before you, and said witness, while present before you, to examine carefully on oath touching the premises. And when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each said witness in your presence. And the same, so taken and subscribed, to return, together with this commission and your doings herein enclosed, sealed and directed to the circuit court aforesaid, now holden at Boston, as soon as the same shall have been executed.

In testimony whereof, we have caused the seal of the said circuit court to be hereunto affixed.

Witness the honorable Roger B. Taney, at Boston, this seventh day of January, in the year of our Lord one thousand eight hundred and fifty-one.

ISAAC O. BARNES,
Clerk of the circuit court of the United States, Massachusetts district.

N. B. You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the deposition, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the deponent whilst giving his deposition in answer to the interrogatories annexed to this commission. And you shall take such deposition in a place separate and apart from all other persons, and permit no person to be present during such examination, except the deponent and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk to assist you in reducing the deposition to writing. And you shall put the several interrogatories and cross interrogatories to the deponent in their order, and take the answer of the deponent to each, fully and clearly.

The execution of this commission appears in certain schedules hereunto annexed.

ROBERT WALSH,
U. S. consul and commissioner.

Paris, 17th February, 1851.

[SEAL.]

Deposition of witness produced, sworn, and examined, the seventeenth day of February, in the year of our Lord one thousand eight hundred and fifty-one, at Paris, in the Republic of France, under and by virtue of a commission issued out of the circuit court of the United States, within and for the Massachusetts district, in a certain cause now pending in said court, wherein Artemas L. Brooks and others, complainants, in equity, versus John Fiske and another, respondents, as follows within.

ROBERT WALSH,
Consul and commissioner.

CIRCUIT COURT OF THE UNITED STATES,
For the first circuit and the district of Massachusetts.

A. L. BROOKS and others
vs.
JOHN FISKE and another.
} In equity.

Interrogatories to be proposed to Mons. A. Perpigna, residing at No. 10, Rue Neuve St. Augustin, in Paris, a witness to be examined in behalf of the defendants in the above entitled cause.

1. Please to state your name, residence, and occupation.

2. Please to state whether you are acquainted with the specifications and drawings of patents, by experience, in the course of your business.

3. Please to examine, in the official records of French patents, the specifications and drawings of the following patents, and annex to your answer, to this interrogatory, exact copies thereof, including the specifications and drawings, full size, to wit, the patent granted by France to Louis Victor Joseph Marc Roguin, March 15, 1817, with an addition thereto granted March 18, 1818; the same being published in the work called Brevets de Inventions, vol. 23, pages 207 to 212, plate 27 and 28; also the patent granted by France to Leonore Thomas de Manneville, March 9, 1825, with an addition thereto, granted April 28, 1825; the same being published in said work, vol. 44, pages 111 to 116, plate 12. Both of said patented machines being for the purpose of planing lumber, boards, &c., and tongueing, grooving, and moulding the same, as expressed in said patents.

J. GILES, *for defendants.*

A true copy.
(Attest:) ISAAC O. BARNES, *Clerk.*

Deposition of Antoine Perpigna.

Antoine Perpigna, residing at No. 10 Rue Neuve St. Augustin, in Paris, Republic of France, aged 50 years and upwards, being duly sworn, pursuant to the directions hereto annexed, and examined on the part of the respondents, doth depose and say as follows, viz:

To the first interrogatory he saith: My name is Antoine Perpigna; my occupation was formerly that of a pleading barrister in the court of appeal of Paris, and is at present, and has been for years, that of a consulting barrister and patent agent for France, and all other countries.

To the second interrogatory he saith: I am thoroughly acquainted with the specifications and drawings of patents, having entered in France upwards of thirteen hundred patents, the specifications of which have all been drawn up by me during many years practice, exclusively of patents procured in other countries.

To the third interrogatory he saith: I have examined in the official records of French patents, at the Conservatoire des Arts et Metiers, the original drawings, in two sheets, and specification of the patent granted by France to Louis Victor Joseph Marc Roguin, March 15th, 1817, and an addition thereto with two sheets of drawings, granted March 18th, 1818, to Louis Antoine Gabriel Roguin, to whom had been assigned the original patent, taken by the above named Louis Victor Joseph Marc Roguin, which specifications and drawings have been, in substance, published in the work called "Description des Machines et procédés contenus dans les brevets d' inventions de perfectionnement et d' importation dont la durée est expiré et dans ceux dont la déchéance a été prononcé," vol. 23, pages 207 to 212, plate 27 and 28.

I have also examined the specification, with three sheets of drawings, of a patent granted by France to Leonore Thomas de Manneville, March 9th, 1825, with an addition thereto, without drawings, granted April 28th, 1825, the same having been, in substance, published in the above mentioned work, vol. 44, pages 111 to 116, plate 12.

Both of these patented machines being for the purpose of planing boards, &c., and tongueing, grooving, and moulding the same, as expressed in said patents and additions.

I have caused to be made copies of the specifications and of the drawings, full size, belonging to the said patents and additions, which I have ascertained to be perfectly exact and accurate, having collated them myself with the original specifications and drawings; the same are signed by me and hereto annexed, and numbered as follows: No. 1, 2, 3, 4, 5, 6, 7, and 8. A. PERPIGNA.

Examination taken, reduced to writing, subscribed by the witness, and by him sworn to, this 17th day of February, in the year of our Lord one thousand eight hundred and fifty-one, before the undersigned.

ROBERT WALSH,

[SEAL.] *Consul and commissioner.*

Working of the machine.

If the carriage drawn by a windlass travels suppose two-tenths of an inch in a second, the plane borne on the axle, put in motion by the wheel J, performs in the same period of time ten revolutions on itself, the teeth of the pinion are in relation to the wheel as 1 to 10. Now this plane being furnished with 18 blades, there results from the combined movement of the tool and the wood submitted to its action, that 180 blades act successively on a length of two-tenths of an inch of wood, which, by reason of the slow, regular, and progressive movement of the carriage on which it is fixed, presents successively to each blade a new particle of wood to be cut away.

In the experimental machine of which I give the plans, the motive power is by men's arms; constructed with the necessary strength to resist a moderate strain, it would not have sufficient strength to overcome the resistance which the wood to be cut away would offer to the tool, if the carriage had a progressive motion more rapid. Thus, in the experimental machine, I lose in time what I gain in power, or to speak more exactly, the time which I lose spares me an expense of power.

Such will not be the case in the large machine; the motive powers which I use in the small machine will be substituted by a single motive power, (steam engine or machine;) the tools having a larger diameter will have more blades, and master of the power to be given to the motive power, I will be enabled, by accelerating the rotatory motion of the tools, to accelerate in proportion the progressive movement of the carriage.

The return of the carriage by one of the numerous methods which mechanism affords to change the continuous circular movement into a rectilineal alternative movement, would cause a considerable time to be lost, inasmuch as the time employed in the return of the carriage should be equal to that expended in going forward. I propose turning into use this return in the action of the large machine, and to lose solely by a suspension of the movement but the necessary time to return or change the wood.

To this end a second axle will be placed after the first; it will carry at its extremity a wheel of the same dimensions as the pinion of the first, which gearing in this pinion will revolve, and cause the second axle to revolve, in a direction contrary to the first. In order that the tools borne by this second axle may not stop the wood in its first movement of advancing, this second axle will be carried by hinged supports, by means of which it may be raised or depressed at will.

By these means, so simple, the two movements of the going and returning of the carriage are adapted to some use. There is, as I have before said, lost but the necessary time to return or change the wood.

I believe it is useless to mention that the adoption of another motive power will change the order of the wheel works, in the structure of the

large machine. However, the wheel work and motive powers, well known means, are but accessaries to the machine.

Done at Paris, the 16th February, 1817.

Signed, ROGUIN,

No. 67, street of the suburb Montmartre.

Explanation of figures.

Sheet marked 1. Plan, figure 1st. Elevation, figure 2d.

A Stationary part of the bench.
B Cornice on which rolls the carriage.
C Carriage.
D Ropes which draw the carriage.
E Frame of wood which carries one of the supports H, of the wheel J, and one of the supports F, of the axle S.
G Pinion in which gears the wheel J.
H Supports of the wheel J.
J Wheel which gears in the pinion G.
K Crank.
L Cross bar of wood or iron, called the guide.
M Wheel of the windlass.
N Pinion into which gears the wheel of the windlass.
P Axle of the windlass around which are entwined the ropes which draw the carriage.
Q Support of the pinion into which gears the wheel of the windlass.
R Crank of the windlass.
S Iron axle which carries the tools.
t Plough plane making a grooving.
u Junction of two plough planes working a tongue by a space existing between the two cutters.
v Plane properly so called, solely intended to plane wood.
x Junction of three planes working a moulding composed of an ogee between two squares.
y, y Board placed edgeways in the carriage and which comes out from under the tool with a groove as *y*.
z, z Board placed in the same way and which comes out from under the tool with a tongue as *z*.
a, a Plank laid on the carriage and which comes out from under the tool planed as *a*, with a moulding as *b*.

Sheet marked 2.

Projection of the tools in their natural size.
1 Elevation of the plan.
2 Plan of the plane.
3 Junction of two plough planes, leaving a space between the two of the size of a tongue.
4 Plough plane to cut out the groove.

5 Plane solely intended to plane.
6 Junction of three planes working a moulding composed of an ogee between two squares.
7 Iron axle which bears the tools.
A, Z Elevation of the carriage on the scale of the plan of the machine.

Paris, 16th February, 1817.

(Signed) ROGUIN,
No. 67, street of the suburb Montmartre.

DEPARTMENT OF THE INTERIOR,

Consultative committee of arts and manufactures.

Session of the 26th March, 1818.

Mr. Louis Antoine Gabriel Roguin prays for a certificate of additions and improvements to his machine for working wood, for which letters patent of the 15th March, 1817, were granted to M. Louis Victor Joseph Marc Roguin.

After taking cognizance of the description of his operations, as well as of the drawings by him furnished, we are of opinion that the certificate prayed for should be granted.

(Signed) THENARD MOTARD,
GAY LUSSAC,
GUILLARD SENAINVILLE,
BARDEL P.

Note in margin. Arts and manuf., 27th March, 1818. No. 57, Reg. 8th, issued 30th March, 1818.

Certificate of addition, 28th February, 1828.

MACHINE TO WORK WOOD.

[No. 51, Reg. 8th, cc.—No. 423.]

Description of the new expedients for which the undersigned prays for a certificate of addition, alterations, and improvements.

The machine for which Mr. Roguin, (Louis Victor Joseph Marc,) my relation, obtained the 15th March, 1817, letters patent, was susceptible of improvements which he had partly indicated in his description furnished in support of his petition. These improvements have been adopted in the construction of the larger machine of which I transmit the plans, elevation, profile, and details herewith.

The parent idea of the first machine could not vary; this parent idea consisted in subjecting the wood to the action of a tool of a particular shape, and to impart to this tool a rotary movement, but the choice remained either of making the tool stationary and causing the wood to advance under it, with a slow and progressive motion, or to impart at the same moment to the tool two motions, one rotatory the other progressive. The way was adopted in the construction of the machine

described in support of the petition for letters patent; the second way has been adopted in the construction of the improved machine.

In the first machine the tool was an iron cylinder, from the thickness of which the knives were made. This cylinder has been substituted by a cast iron cylinder, (30,) on which moveable blades, (35, 36, &c.,) are held in a pair of jaws, the lower one of which is immoveable and is part of the cylinder, and the upper one moveable, (33,) the blades are fastened between these jaws by pressure screws, (34,) which are to be seen on the moveable part of the jaws; on the lower part of the jaws are attached small steel blades, which fulfil the office of the second iron in planes with two irons; experience has taught that this precaution is indispensable to avoid a very great inconvenience, that of slivering the wood when the fibres tend in different directions, which frequently happens around knots.

The tool is borne by a cast iron carriage, (19,) and to the back part of this carriage is attached an iron axletree, (18,) bearing two brass pinions, which gear into a rack and tend to regulate the movement of the carriage.

The bench (21) moves itself vertically by means of screws, (29,) which support it, and tend to raise it or lower it according to the thickness of the wood to be worked. Four small graduated plates of metal, placed in the interior angles of the superstructure, act as a regulator to fix this bench in a perfectly horizontal position.

Two iron squares (27) abut the bench at both ends.

Experience has taught that the weight of the bench was not sufficient, singly, to prevent the vibration imparted to it by the machine when in operation, and there resulted from this vibration waves on the surface of the planed wood. This means caused them to disappear. The carriage (19) is of cast iron, and weighs about two hundred and forty-one pounds. It is necessary that this carriage should be of sufficient weight so as not to be raised by the strain of the tool, a strain, however, much less considerable in this than in the first described machine; for in the latter the edge of the tool was perpendicular to the axis, whilst the sloping cut of the new tool is nearly tangent to its circumference.

The pulley (3) receives motion from the motive power, (4,) which is adherent to it; the latter communicates the motion to the tool by means of the pully (5) entwined with the cord, which returns by the return pulley.

The axle-tree (28) bears on its extremity a brass pinion, into which gears a wheel with iron cogs, (8;) to this wheel adheres a pulley, (9,) which, by means of the cord which surrounds it, communicates the motion to the carriage by the pulley (10) attached to the extremity of the axletree (18.) The rope, after passing through this last pulley, returns by the return pulley (11.)

The back part of the bench carries a claw, (23,) against which the wood is rested and stopped like on a carpenter's bench. At the other extremity the wood is stopped by moveable dogs, (24,) which pass under a bar, (25,) through which pass pressure screws.

The carriage is rapidly brought back from the starting point by means of a ratchet wheel, and a dog placed between the cog-wheel [No. 8] and the pulley [9.]

We have seen, in the description of the first machine, that the piece called guide (because it serves effectively to guide the wood under the tool for grooving, tongueing, and moulding) was fixed on the superstructure of the bench. In the new machine this piece is borne by the carriage.

PARIS, 27 *February*, 1818.

Signed,

LOUIS ROGUIN, (LOUIS ANTOINE GABRIEL,)
No. 14, Vivienne street Hotel.

Nomenclature of the constituting pieces of the machine with the referring numbers.

1. Superstructure of the machine.
2. Prolongation of the superstructure bearing the axle, No. 18; the cog-wheel, No. 8; and the pulley, No. 9.
3. Pulley which is put in motion by the motive power.
4. Large pulley adhering to No. 3, and communicating the motion to the tool.
5. Pulley of the tool.
6. Return pulley.
7. Pinion placed at the extremity of the axletree, No. 28, of the pulley of the motive power.
8. Cog-wheel moved by the pinion, No. 7.
9. Pulley adhering to the cog-wheel and communicating motion to the following pulley.
10. Pulley fixed to the axle tree, No. 18, of the pinions of the carriage. [See the plan.]
11. Return pulley.
12. Cross bars, through which pass the screws, 29, which support the moveable bench. [See the profile.]
13. Rope of the motive power.
14. Rope communicating motion to the pulley of the tool.
15. Rope communicating motion to the pulley of the carriage.
16. Racks.
17. Pinions, which gear in the racks, to regulate the motion of the carriage.
18. Caxletree of the pinions of the pulley, No. 10.
19. Carriage.
20. The tool.
21. Vertically moveable table.
22. Wood submitted to the action of the tool.
23. Claw.
24. Moveable dogs.
25. Cross bar over the dogs.
26. Pressure screws of the dogs.

27. Squares abutting the moveable table.
28. Axletree of the pullies, No. 3 and 4, of the pinion, No. 7.
29. Screws imparting the vertical motion to the bench.
30. Body of the tool.
31. Piece of iron enclosed in a pair of jaws, the upper lip of which is moveable.
32. Steel blade attached to the under lip, and performing the office of under iron in planes with two irons.
33. Upper lip.
34. Pressure screws.
35. Planing iron.
36. Grooving iron.
37. Tongueing iron.
38. Moulding iron.

PARIS, *27th February*, 1818.
Signed, L. ROGUIN, (LOUIS ANTOINE GABRIEL.)
No. 14, Vivienne street Hotel.

Thomas W. Harvey, T. B. Stillman, Henry R. Worthington, Henry R. Dunham, J. Ericsson. At the execution of a commission for the examination of witnesses, between Artemas L. Brooks and others, complainants, and John Fiske and another, respondents, the within paper writing was produced and shown to the several witnesses whose names are above written, and by them deposed unto at the time of this examination, and signed by said witnesses to identify the same.

WILLIAM DODGE,
Commissioner.

NEW YORK, *April* 5, 1851.

Exhibit E.

DEPARTMENT OF THE INTERIOR.

Consultative committee of Arts and Manufactures.

Session of the 29th January, 1825.

Mr. Thomas de Manneville, resident of Gonneville sur Honfleurs, prays for letters patent, for fifteen years, for an invention for planing, grooving, and joining boards of all dimensions, making all sort of inlaid work, and other carpenter's work. The Sieur de Manneville's description being sufficiently clear and detailed, and the three plans which accompany it being well executed, we are of opinion that the patent prayed for may be granted.

Nevertheless we deem it right to apprize the petitioner, that the Sieur Roguin is the proprietor, in Paris, near the "Jarden des Plantes," of a manufactury, under letters patent, for analogous means to work wood; it behooves the Sieur de Manneville to ascertain if really his

expedients differ from those of the Sieur Roguin, in order not to obtain a patent which would become a nullity.

(Signed) J. T. ROARD,
" F. MOTARD THENARD.
GUILLARD SENARNVILLE,
9th March, 1825. *Secretary.*

Letters patent, for fifteen years, granted to the Sieur Manneville, (Leonore Thomas,) of St. Quentin:

For two machines having for object the grooving, planing and reducing to a uniform thickness wood intended for inlaid work; as well as all sorts of boards whatever may be their dimensions. The inventor calls them a groover and planer.

By the grooving machine, (plan 1st,) the two joints, the tongue and the groove, are made at the same time.

The tongue side is made by means of five circular saws, of which three (A, B, C,) revolve each on an axis horizontally fixed; and the two others (D, E,) revolve horizontally on a single and same axis vertically fixed.

The effect of the saw A, (fig. 1st,) is to join the tongue O.

That of the saw B is to cut the board underneath to the depth of the tongue O merely.

That of the saw C is to cut the board above to the depth of the tongue O merely.

And that of the saw D and E is to free the tongue O from the wood attached thereto, as well above as underneath, by cutting the board horizontally, till it has attained the notches made by the saws B and C above mentioned.

The object of the fork F, is to displace at the same time the two small laths K and L, which, by the operation described, from above and beneath the tongue, and carry off the two sharp corners of the said tongue, to facilitate the introduction of the latter in the groove M, which has been made at the same moment, and which I will now describe.

It is observable that by this operation there is, we might say, little or no loss of wood; and that the two sides of the groove, which carpenters, with the ordinary tools, reduce with great toil and length of time, to splinters of almost no value; are formed by the new operation, into so many small rules or laths, which can be usefully employed in many ways.

Fig. 2, (plan 1st,) shows the operation of the groove M. The saw G, fixed on the axis of the parallel saw A, has the same effect as the latter one, that of joining, and the two saws H and J turning together horizontally, on a vertical axis, cut in the same parallel, the board precisely to the depth fit for the groove M, adapted to receive a tongue similar to the one above described.

Again, this groove is cleared by a plough plane, armed with a number of consecutive blades, biting gradually, and which receives from

the common motive power a precipitate movement, forward and retrograding, during the whole of the operation.

To one of these blades is fitted a small tool, in the shape of a saw tooth, whose effect is to cut away the sharp corners on the two sides of the groove.

For the same purpose, I equally make use, sometimes, of a tool bearer N, set in a vertical axis. This tool bearer is armed with a number of blades, nearly resembling those of the plough planes, with the exception that they present themselves in an inverse manner, and obliquely to meet the wood, which they neatly cut away.

The board about to be grooved is previously well fixed on a carriage, driving between two conductors, which allow it no variation in any way, and which carries the wood to be worked at the will of the operator.

To obviate the plank from presenting itself to the action of the tools with the least possible curve, I make use of a weight, which bears by a roller, on the board, at the spot where the planing is about to begin. We are enabled by a movement of the foot, or otherwise, to increase or diminish the weight by causing the weight to slide from right to left, or from left to right, according as it may be necessary. This weight very nearly resembles the ancient steelyard, on which the same weight serves, by a forward or retrograde motion, to obtain the weight of any object whatsoever, with the simple difference, however, that the support thereof is placed between the weight and the object to be weighed; whilst in the latter the lever is fixed behind, and that it is the roller which constitutes the resting point. The application of any other system of weight may be equally adopted. I myself have made use of another, on one of my tables, where I enclosed all the mechanism in a cylinder of eighteen inches, merely by means of two apertures, of about two inches in height, on each side of the cylinder; the wood enters in a rough state, and comes out finished from the cylinders, into which are concentrated all the working tools, which remain unseen; an opening is reserved underneath, to allow the saw dust, produced by the two circular saws, to escape.

The same operation is produced by the same machine, at the ends of the boards, as that on the two sides which has just been described, whatever false square is desired to be given to the wood. All the secret, then, consisting in the direction to be given to the carriage, which carries the wood to meet the tools.

I consider it useless to describe minutely the wood work on which are fixed the tools, gearing stability and dimensions of the wheel work, because it is for the builder to calculate the movements which are to produce the required effects; and to obviate that, the action of my part should prevent the working of any other.

It is useless to mention, after the title of this description, that everything must be calculated so as to be enabled to plane wood of every width, thickness, and length. Thus, the saws, plough planes, or tool bearers, &c., must necessarily of themselves, separate, draw near, rise and fall, and the saws B, C, in an inverse way, as necessary.

The machine of my invention contains all these advantages, and can easily, worked by one man, having the wood at hand, operate in twelve hours on two or three thousand feet of plank.

In order to plane or reduce in thickness the board, A, (pl. 4.) it is placed on its edge, on the rollers B, B, B, whose axis are horizontal. Two fluted cylinders, C, D, vertically placed parallel to each other, press the boards on both sides. The boxes of one C are stationary; those of the other, moveable in gutters, to answer the variations of the thicknesses of the wood to be planed. The effect of a spring or weight on the hind boxes determines the equal and constant pressure of the cylinder against the board.

Two tool bearers, armed with planes E, H, with double irons fixed obliquely, and in an inverse manner, are moved forward and backward by a double crank F, on which is fixed, at one of the extremities, the motive wheel G.

E, one of these tool bearers, (which perform a precipitate movement, forward and retrograding,) should not rise or fall more than they separate, or draw near the board A; it is this one that goes to seek it, whilst, on the contrary, the other H separates or approaches, as required.

When the board has attained, and been reduced to the required thickness, the tool bearer H meets rollers, on which it rubs, and which prevent the iron from biting more deeply in the wood.

The rollers ought to be set in such a manner, as to enable them to advance or retire, as it is from their separation that depends what thickness the wood shall obtain. Springs or weights gradually bring the tool bearer H to meet the board.

Besides the two cylinders, (C, D,) of which mention has just been made, there are two others, (J, L,) at the extremity of the frames, equally placed vertically; but they are stationary in their boxes, because when the board meets them it has undergoone all operation; it is then reduced to the required thickness, and requires merely the use of these cylinders to direct its exit, after it has left the introductory cylinders C, D.

All these cylinders bear on their ends a wheel, (M, N, O, P,) whose diameter is to be regulated on the thickness of the wood which is worked. The two first (M and N) catch together, and the other, (O, P,) the same thing.

Above each of the wheels N and P, is placed either a wheel cogged for a chain, after Vaucanson's plan, or a triple crank, (Q, R,) worked by the hand, by means of a (nille,) to work the four wheels together. It is the two first, (C, D,) which convey the plan to be worked.

Paris, 18th December, 1824.

(Signed) DE MANNEVILLE.

DEPARTMENT OF THE INTERIOR.

Consultative Committee of Arts and Manufacturers.

Session of the 2d April, 1825.

The Sieur de Manneville prays for a certificate of addition to his letters patent, which were granted him the 9th March, 1825, for machines adapted to plough plane wood, intended for inlaid work. The explication given by the petitioner, in support of his prayer, being sufficiently clear, we are of opinion that the certificate may be granted.

(Signed,) ROARD, THENARD,
GUILLARD SENARNVILLE.

28th April, 1825.

Letters patent of Invention and Improvement.

In the description of my mode of operation, filed at Paris, in the secretary office of the department, the 18th December, 1824, wherein I fear I have not been sufficiently explicit, I said, "the board to be grooved is previously well fixed on a carriage, driving between two conductors, which allow it no vibration in any way, and which carries the wood to be worked at the will of the operator." I then meant a carriage, (carrying the wood between the cylinder,) which it was necessary, after taking therefrom the worked wood, to bring back each time to its first place, in order to receive thereon new wood to be worked, which necessarily occasioned a loss of time, which it is desirable to prevent.

This system which, however, I do not abandon, for certain species of work, possessed the inconvenience of obliging the operator to change his position twice, in grooving each piece of wood. Firstly, he was obliged to fix the piece on the carriage before the cylinder, then withdraw to the back of the latter, to detach the finished wood from the carriage, and then return to the front, to draw back the carriage to its first position, to receive a new piece of wood.

This mode of operation condemned the operator to perpetual motion, fatiguing him, and occasioning him a considerable loss of time. To remedy this, there would have required two operators, instead of one. One in front, the other at the back of the cylinder, from whence would have resulted an increase of expense, in manual labor, of one hundred per cent.

I have now discovered means which dispense with all operation back of the cylinder, economizes a great deal of time, and simplifies infinitely the operation. This improvement consists as follows, for which I pray a privilege for fifteen years:

The conductor, which at first was but one piece, as almost all conductors, is now constructed of a number of parts, of two, four, and six inches in length, more or less, joined by hinges, and forming a whole, perfectly equal in breadth and thickness. Each of these divisions carries a rack, and also one or two square holes, larger at the bottom than above, in which is found lodged nuts, which tighten the holdfasts. It

is by uniting this separated part that I make a sort of chain, which being perfectly kept in its line, between well fitting guides, constitutes my new carriage.

When this carriage has crossed the cylinder, and that, consequently, the wood has undergone its operation, and is bent by the effect of its own weight, and is, by the working of the hinges, detached from under the holdfasts and falls to the ground, each link of the carriage doubled underneath, the mechanism comes alternately to retake its first position before the cylinder, there to receive new wood from the hand of the operator, whose sole occupation is now to constantly place new wood under the holdfasts whilst the groover is in active operation, and by itself alone, jointing, tongueing, grooving, and throwing off the wood in proportion as it is perfected.

I consider it useful that one of my means of pressure used on the wood, to which it was my intention to refer in my description of the 18th December last, is a spring, at whose extremities is a shuffle board, whose cheeks are of the diameter of at least one inch more than the shuffle board, so that the cheeks alone may rest on the wood, and that this shuffle board may pass above the nuts and bolts of the holdfasts, without in the least touching them, which would counteract the regular pressure which these cheeks should constantly have on the wood.

I ought also to have mentioned that, by means of the planing tool, all kinds of moulding may be effected on wood.

There *is exists* for this purpose, but to substitute in the stead of the planes, on the tool bearers E H, edges or drills, corresponding to the figure desired to be sculptured on wood.

Paris, 26th February, 1825.

(Signed) THOMAS DE MANNEVILLE.

Thomas W. Harvey, T. B. Stillman, Henry R. Worthington, Henry R. Dunham, J. Ericsson. At the execution of a commission for the examination of witnesses, between Artemas L. Brook and others, complainants, and John Fiske and another, respondents, the within paper writing was produced, and shown to the several witnesses, whose names are above written, and by them deposed unto, at their time of their examination, and signed by said witnesses to identify the same.

WILLIAM DODGE, *Commissioner*.

New York, April 5th, 1851.

MINISTERE DE L'INTERIEUR.

Comité consultatif des arts et manufactures.

Seance du 6 Mars, 1817.

Le Sieur Roguin demeurant à Paris, rue de Faubourg Montmartre, No. 67, demande un Brevet d'Invention de 15 ans, pour une machine propre à travailler les bois de toute nature et de toutes dimensions,

AVIS.

Les dessins et mémoire descriptif que le petitionnaire a présentés étant suffisaniment claires et detaillés, nous pensons que rien ne s'oppose à la delivrance du susdit brevet.

Signé, THENARD,
T. L. ROARD,
MONTGOLFIER, and
GUILLARD SENARNVILLE, *Secretaire.*

Mention en marge, delivré le 15 Mars, 1817.

Brevet de Quinze ans.

Description d'une machine propre à travailler les bois de toute nature et de toutes dimensions.

Le titre de ce mémoire pourrait induire en erreur sur son contenu, si nous ne nous hâtions de prevenir que nous n'avons point à nous occuper des operations que l'on fait subir au bois jusqua'au moment, où, reduit en madriers et en planches plus ou moins epaisses, il est livré au commerce pour les besoms de la consommation.

Personne n'ignore à combien d'usages le bois est employé; cependant cette matiere si commune, et que la nature nous fournit si abondamment, n'est pas encore assez généralement utilliseé, et parmi les nombreux objects auxquels il serait utile de l'employer, je me contenterai de citer ces mortels carreaux de terre cuitte auxquels il serait si desirable qu'on pût substituer le bois.

La principale cause qui, jusqu'ici s'est opposeé à un emploi plus genéral du bois, c'est la cherté de la main d'ouvre la réduire de beaucoup, et mettre ainsi à la porteé du plus grand nombre l'usage habituel du bois, tel sera le résultat des nouveaux procédés dont l'inventeur va faire la description.

Le travail du bois, quelque soit l'usage auquel on le destiné, peut se reduire à quatre operations principales qui sont :

1. Le rabater.
2. Faire les rainures et les languettes pour joindre le bois.
3. Faire les moulures qui lui servent d'ornement.
4. Faire les tenons et les mortaises pour assembler l'ouvrage.

Cette derniere operation n'est pas susceptible d'être faite par une machine puisque la place des tenons et des mortaises dépend de la longueur des bois d'assemblage, et que cette longueur dépend elle-même des dimensions de tout l'ouvrage, mais les trois premières operations peuvent être faites, et sont réellement exécutées par la machine, ainsi qu'on le voit sur le plan ; une planche *a a* est soumise à l'action de la machine, la partie en *a* est rabotée, la partie en *b* a reçu une moulure composée d'une doucine entre deux carrés. On a soumis simultanément à l'action de la machine deux planches posées de champ *y y* et z z, qui ont reçu la première, une rainure en y, l'autre une languette en z.

Description de la machine.

Cette machine se compose comme suit :

Un etabli en deux parties, l'une fixe [A] l'autre mobile et que je nomme le chariot [C;] ce chariot porte sur six roulettes (Voir son elevation sur la feuille où sont dessinés les outils,) roule sur une partie saillante que je nomme corniche (B) ce chariot mobile aura lui-même un fond mobile qui, au moyen de vis de rappel placées de haut en bas dans l'épaisseur des bois qui forment l'assemblage du dit chariot, sera élevé ou abaissé selon que l'exigera la plus ou moins grande epaisseur du bois soumis à l'action de la machine. Je me suis dispense de faire executer ces details dans la machine que je décris, parceque du bois d'une seule epaisseur me suffisait pour faire mes essais.

Ce chariot est tire par un treuil, dont l'axe porte à son extremité une roue [M] qui engrène dans un pignon [N] à l'extremité de l'axe duquel est placée la mannivelle (R.)

Sur la partie fixe de l'etabli est placé un arbre en fer (S) termine par les tournillons qui tournent entre des coussinets de cuivre enfermés dans des supports en fer F, l'extremité de l'arbre porte un pignon G, dans lequel engrène la grande roue J, mise en mouvement par la mannivelle (K.)

L'arbre porte les outils auxquels je donne le nom de rabots; ces outils sont cylindriques, ils ont plus ou moins de diametre et plus ou moins d'epaisseur selon l'effet qu'ils doivent produire; les lames dont ces cylindres sont garnis sont prises dans l'epaisseur du fer, elles sont taillées obliquement ; au milieu du cylindre est un trou carré dans lequel entre l'arbre, les outils sont fixés sur cet arbre par des goupilles.

t, est un rabot bouvet destiné à faire le rainure executée en *y;* (u) est un assemblage de deux rabots bouvet destiné à faire une languette que l'on voit executée en z.

(v) est un rabot proprement dit uniquement destiné à rabotée le bois.

(x) est un assemblage de trois rabots représentant une doucine entre deux carrés.

Tous ces outils sont dessinés en grandeur naturelle sur la feuille cotée 2.

Jeu de la machine.

Si le chariot tiré par le treuil parcourt, je suppose, cinq millimetres en une seconde, le rabot porté par l'arbre mis en mouvement par la roue J, fait pendant le même temps dix tours sur lui-même (les dents des pignons sont à celles de la roue commé 1 à 10;) ou ce rabot étant armé de dix-huit lames, il resulte des mouvements combinés de l'outil et du bois soumis à son action, que 180 lames agissent successivement sur une longueur de cinq millimetres de bois qui, à raison du mouvement lent, regulier, et progressif du chariot sur lequel il est placé, présente successivement à chaque lame une nouvelle parcelle de bois à enlever.

Dans la machine d'essai dont je donne les plans, les forces motrices sont des bras d'homme; construite avec la force necessaire pour resister à un effort moderé, elle n'en offrait pas assez pour vaincre la resistance qu'offrait à l'outil le bois qu'il aurait à enlever si le chariot avait un mouvement de progression plus rapide ; ainsi dans cette machine d'essai je perds en temps ce que je gagne en force, ou, pour parler plus exactement, le temps que je perds m'epargne une dépense de force.

Il n'en sera pas ainsi dans la machine executée en grand; les forces motrices que j'emploie en petit, seront remplacées par un moteur unique, (manege ou machine à vapeur,) les outils ayant un plus grand diametre pourront avoir plus de ames, et maitre de la force à donner au moteur je pourrai, en accélérant le mouvement de rotation des outils accélérer en proportion le mouvement progressif du chariot.

Le retour du chariot par un des nombreux moyens que fournit la mecanique pour changer le mouvement circulaire contenu en mouvement rectiligne alternatif, ferait perdre un temps considerable, puisque le temps employé au retour du chariot devrait être egal à celui qu'il aurait mis à aller; je me propose d'utiliser ce retour. Dans l'emploi de la machine en grand, et de ne perdre, au moyen d'une suspension de mouvement, que le temps necessaire pour retourner ou changer de bois.

A cet effet un seconde arbre sera placé après le premièr, il portera à son extremité une roue de même dimension que le pignon du premièr, lequel engrène dans ce pignon, tournera et fera tourner le seconde arbre en sens contraire du premièr; pour que les outils portés par ce seconde arbre n'arretent pas le bois dans son premièr mouvement d'aller, ce seconde arbre sera porte par des supports à charnière de maniere à pouvoir être levé et baissé à volonté.

Par ce moyen fort simple, les deux mouvements de va et de vient du chariot sont utilisés, et il n'y a comme je l'ai deja dit, de perdu, que le temps necessaire pour retourner ou changer le bois.

Il est je crois inutile de prévenir que l'emploi d'un autre moteur changeait la disposition des rouages dans l'execution de la machine en grand, au reste, les rouages et les moteurs, moyens connus, ne sont que des accessoires de cette machine.

Fait à Paris le 16 Fevrier, 1817.

Signé ROGUIN,

Rue du Faubourg Montmartre No. 67.

Explication des figures.

Feuille cotée 1. Plan figure 1. Elévation figure 2.

A Partie fixe de l'etabli.
B Corniche sur laquelle roule le chariot.
C Chariot.
D Cordes qui tirent le chariot.
E Chasis de bois qui porte un des supports H de la roue J et l'un des supports F de l'arbre S.

G Pignon dans lequel engréne la roue J H supports de la roue J.
J Roue qui engréne dans le pignon G.
K Manivelle.
L Barre de bois ou de fer nommée le guide.
M Roue de treuil.
N Pignon dans lequel engréne la roue du treuil.
P Axe du treuil autour duquel s'enveloppent les cordes qui tirent le chariot.
Q Support du pignon dans lequel engréne la roue du treuil.
R Manivelle du treuil.
S Arbre en fer qui porte les outils.
T Rabot bouvet qui fait une rainure.
U Assemblage de deux rabots bouvets formant une languette par l'intervalle qu'ils laissent entre eux.
V Rabot proprement dit, uniquement destiné à raboter le bois.
X Assemblage de trois rabots formant une moulure composée d'une doucine entre deux carres.
Y Y Planche placée de champ dans le chariot, et qui sort de dessous l'outil avec une rainure en Y.
Z Z Planche placée de même et qui sort de dessous l'outil avec une languette en Z.
A A Planche posée à plat sur le chariot et qui sort de dessous l'outil, rabotée en *a* et avec une moulure en *b*.

Feuille cotée 2.

Projection des outils en grandeur naturelle.

1 Elevation du rabot.
2 Plan du rabot.
3 Assemblage de deux rabots bouvets laissant entr' eux l'intervalle d'une languette.
4 Rabot-bouvet pour creuser la rainure.
5 Rabot uniquement destiné à raboter le bois.
6 Assemblage de trois rabots formant une moulure composeé d'une doucine entre deux carrés.
7 Arbre en fer qui porte les outils.
A Z Elevation du chariot sur l'echelle du plan de la machine.

Paris, le 16 Fevrier, 1817.
(Signé) ROGUIN,
Rue du Faubourg Montmartre, No. 67.

MINISTERE DE L'INTERIEUR,

Comité Consultatif des Arts et Manufactures.

Séance du 26 Mars, 1818.

Le Sieur Louis Antoine Gabriel Roguin solicite un certificat d'addition et de perfectionnement à sa machine à travailler le bois pour la-

quelle il a été delivré un brevet d'invention le 15 Mars 1817 au Sieur Louis Victor Joseph Marc Roguin.

Après avoir pris connaissance de la description de ses moyens, ainsi que des dessins qu'il a fournis, nous pensons que le certificat demandé peut être accordé.

(Signé) THENARD,
MOTARD,
GAY LUSSAC,
GUILLARD SENARNVILLE,
Bardel st.

Mention en margen Arts et Manuf. 27 Mars, 1818, No. 57. Reg. 8 delivrée le 30 Mars, 1815.

Certificat d'Addition. 28 *Fevrier* 1818.

Machine à travailler le bois. (No. 51 Reg. 8 C C No. 423.)

Description.

Des nouveaux procédés pour lesquels le soussigné demande un certificat d'addition, changements et perfectionnements. La machine pour laquelle Monsieur Roguin (Louis Victor Joseph Marc) mon parent, a obtenue le 15 Mars 1817 un brevet d'invention, etait susceptible de perfectionnements qu'il avait en partie indiqués dans la description mise à l'appui de sa demande. Ces perfectionnements ont être adoptés dans l'exécution de la machine en grand, dont je remets ci'joints, les plans, elévation, profil et details.

L'idée mére de la première machine ne pouvait varier: cette idée mére consistait à soumettre le bois à l'action d'un outil d'un forme particuliere et d'imprimer à cet outil un mouvement de rotation; mais on avait le choix ou de fixer l'outil et de faire avancer le bois sous lui d'un mouvement lent et progressif, ou d'imprimer en même temps à l'outil deux mouvements, l'un de rotation, l'autre de progression. On avait pris le premier parti dans la construction de la machine decrite à l'appui de la demande du brevet; on a adopté le second dans la construction de la machine perfectionnée.

Dans la première machine l'outil était un manchon de fer dans l'epaisseur duquel les lames étaient prises. *Aiece* manchon on a substitué un noyau [30] en fer fondu, sur lequel les lames mobiles [35, 36 Ta.] sont tenues dans une machoire dont la partie inferieure est fixé et appartient au noyau, et la partie superieure est mobile; [33] les lames sont serrées entre ces deux machoires par les vis de pression [34] que l'on voit sur la partie mobile de la machoire. Sur la partie inferieure de la machoire sont fixées de petites lames d'acier qui font l'office du second fer des rabots à deux fers; la pratique a fait reconnaitre que cette precaution est indispensable pour éviter un inconvénient très grave, celui de faire eclater le bois lorsque les fibres vont dans des sens differents, ce qui arrive très souvent surtout autour

des nieuds. L'outil est porté par un chariot [19] en fer fondu et à la partie posterieure de ce chariot est fixé un essieu en fer [18] qui porte deux pignons en cuivre [17] lesquels engrenent dans la cremailliere (16) et servent à regulariser le mouvement du chariot.

La table (21) se meut verticalement au moyen des vis (29) qui la supportent et servent à l'elever et à la baisser selon l'epaisseur du bois que l'on doit travailler. Quatre petites plaques de metal graduées sont placées aux angles interieurs du batis, et servent de regulateur pour mettre cette table dans une position parfaitement horizontale.

Deux equerres en fer (27) buttent la table aux deux extremités. La pratique a fait connaitre que le poids de la table ne suffisait pas seul pour empecher la vibration que lui donnait la machine en mouvement, et il resultait de cette vibration des ondes à la surface du bois raboté; ce moyer les a fait disparitre.

Le chariot (19) est en fer fendu et pose, y compris l'outil environ 110 kilo. il est necessaire que ce chariot ait un poids suffisant pour n' être pas soulevé par l' effort de l' outil sur le bois, effort dependant beaucoup moins considerable ici que dans la première machine décrite, puisque dans celle-ci le tranchant de l'outil etait perpendiculaire à l'axe. tandis que le bis eau du nouvel outil est presque tangent à la circonférence.

La poulie (3) recoit le mouvement du moteur; elle entraine la grande poulie (4) qui lui est adherent celle-ci communique le mouvement à l'outil au moyen de la poulie (5) enveloppee par la corde qui revient par la poulie de renvoi (6.)

L' essieu (28) porte à son extrémité un pignon en cuivre (7) dans lequel engrene une roue denteé en fer (8) à cette roue adhere une poulie (9) laquelle, au moyen de la corde qui l'enveloppe, communique le mouvement au chariot par la poulie (10) fixée à l'extrémité de l'essieu (18.) La corde apres avoir passé sur cette dernièr poulie revient par la poulie de renvoi (11.)

La partie posterieure de la table porte un crochet (23) contre lequel le bois est butté et arreté comme sur les établis de menuisier. A l'autre extremité le bois est arrette par des griffes mobiles (24) qui passent sous une bride (25) que traversent des vis de pression (26.)

Le chariot est ramené rapidement à son point de départ au moyen de la roue à rochet et du cliquet placés entre la roue dentée (8) et la poulie (9.)

On a vu dans la description de la premiere machine que la pière nommée guide (parce qu 'effectivement elle seut à guider le bois sous l' outil pour faire les rainures, languettes et mouloures) était fixée sur le bâtis de l' étable; dans la nouvelle machine cette pièce est portée par le chariot.

Paris, le 27 Fevrier, 1818.

(Signé)

LOUIS ROGUIN (LOUIS ANTOINE GABRIEL,)

Rue et Hotel Vivienne No. 14.

Nomenclature des pièces constitutives de la machine, avec les numéros de renvoi.

1 Batis de l'etabli.
2 Prolongement du bâtis portant l'essieu No. 18, la roue a dents No. 8 et la poulie No. 9.
3 Poulie qui recoit le mouvement du moteur.
4 Grande poulie adherente à celle No. 3 et communiquant le mouvement à l'outil.
5 Poulie de l'outil.
6 Poulie de renvoi.
7 Pignon placé à l' extremité de l'essieu No. 28 de la poulie du moteur.
8 Roue dentée recevant le mouvement par le pignon No. 7.
9 Poulie adherente à la roue dentée et communiquant le mouvement à la poulie ce-après.
10 Polie fixée à l'essieu No. 18 des pignons du chariot (voyez le plan.)
11 Poulie de renvoi.
12 Traverses dans lesquelles passent les vis (No. 29) qui supportent la table mobile (voyez le profil.)
13 Corde du moteur.
14 Corde communiquent le mouvement à la poulie de l' outil.
15 Corde communiquant le mouvement à la poulie du chariot.
16 Cremailléres.
17 Pignons qui engrenent dans les cremailléres pour régulariser le mouvement du chariot.
18 Essieu du pignon et de la poulie No. 10.
19 Chariot.
20 Outil.
21 Table mobile verticalement.
22 Bois soumis à l'action de l' outil.
23 Crochet.
24 Griffes mobiles.
25 Brides des griffes.
26 Vis de pression des griffes.
27 Equerres butant la table mobile.
28 Essieu des poulies No. 3 et 4 et du pignon No. 7.
29 Vis donnant le mouvement vertical à la table.
30 Noyau de l' outil.
31 Fer serré dans une machoire dont la levre superieure est mobile.
32 Lame d' acier fixée sur la mâchoire inferieure et faisant l'office du fer inferieur des rabots à deux fers.
33 Lévre supérieure.
34 Vis de pression.
35 Fer à corroyer.
36 Fer à rainure.

37 Fer à languette.
38 Fer à moulure.

Paris, le 27 Fevrier, 1818.
(Signé) L. ROGUIN, (Louis Antoine Gabriel,)
Rue et Hotel Vivienne No. 14.

Ministere de L'Interieur.

Comité consultatif des arts et manufactures.

Séance du 29 Janvier, 1825.

Le Sieur Thomas de Manneville, resident à Gonneille sur Honfleurs, demande un brevet d'invention de 15 ans, pour polir, bouveter, et joindre des planches de toute dimension, fair tout espèce de parquets et autres ouvrages de menuiserie. La description du Sr. de Manneville étant suffisamment claire et detaillée, et les trois plans qui l'accompagnent étant bien exécutés, nous pensons qu'on peut accorder le brevet solicite.

Cependant nons croyons devoir averter le petitionnaire que le Sieur Roguin possède à Paris, près le Jardin des Plantes, un établissement breveté pour une maniere analoque de travailler le bois. C'est au Sieur de Manneville à s'assurer si reéllement ses procedés different de ceux du Sr. Roguin, afin de ne pas prendre un brevet qui deviendrait nul.

Signé J. L. Roard, F. Motard, — Thenard, Guillard Senainville, Jne.

9 Mars, 1825.

Brevet d'Invention de Quinze ans.

Au Sr. Manneville (Leonore Thomas) à St. Quentin.

Pour deux machines ayant pour objet de bouveter, de blanchir, et de réduire à égale épaisseur des bois destinés à faire des parquets, aussi bien que toutes sortes de planches, quelle que sut leur dimension. L'Inventeur les nomme bouveteur et planeur.

Par la machine à bouveter (Planche 1re.) les deux jointures la langu tte et la rainure se font tout à la fois.

Le côté de la languette se fait au moyen de cinq scies circulaires dont trois A B C sont montées sur chacune un axe placé horizontalement, et les deux autres D E tournent horizontalement sur un seul et même axe verticalement.

L'office de la scie A (Fig 1re) est de joindre la languette *o*.

Celui de la scie B est de fendre la planche en dessous jusqu'à profondeur de la languette O seulement.

Celui de la scie C est de fendre la planche en dessus jusqu'àae profondeur de la languette O seulement. Et celui des scies D et E est

d'isoler la languette O du bois qui lui etait attaché tant dessus que dessous, en coupant horizontalement la planche jusqu'à ce qu'elles atteignent les entailles faites par les scies B et C qui précèdent.

L'office de la fourchette F est à la fois de déplacer les deux petites tringles K L, qui par l'operation decrite ont été detachées du dessus et du dessous de la languette et d'enlever les deux vive-arrête de la dite languette afin de faciliter l'introduction de celle-ci dans la rainure M qui vient de se former en même temps et que je vais decrire.

On remarque que par ce procédé il n'y a pour ainsi dire aucune perte de bois, et que les deux côtés de la rainure, que les menuisiers avec les outils ordinaires réduisent peniblement et longuement en volets presque de nulle valeur, forment par le nouveau procéde autant de petites règles ou tringles qui peuvent être utilement employées à divers ouvrages.

La fig. 2, (planche 1re), présente l'operation de la rainure M. La scie G montée sur l'axe de la scie parallèl A, fait comme celle-ci l'office de joindre, et les deux scies H et J tournant horizontalement ensemble sur un axe vertical, fendent parallèlement la planche, précisément à la profondeur que doit avoir la rainure M, calculée pour recevoir une languette sembable à celli-ci dessus décrite.

Puis cette rainure est evidée par un bouvet armé de plusieurs fer echelonnés et mordant graduellement, lequel reçoit, du moteur commun à toute l'operation, un mouvement précipité en avant et retrograde.

A l'un de ces ferrements on adapte un petit outil en forme de tirepont, dont l'office est d'enlever la vive arrête des deux côtés de la rianure.

Pour le même but je me sers également quelquefois d'un porte outil N, monté sur un axe vertical. Ce porte outil est armé de plusieurs ferrements ressemblant assez à ceux des bouvets, à l'exception qu'ils se presentent alternativement en sens inverse et obliquement à la rencontre de bois qu'ils enlevent nettement.

La planche qu'on veut bouveter est préalablement bien assujettie sur un chariot marchant entre des conducteurs, qui ne lui permettent de variation en aucun sens, et qui apporte le bois au travail conformément à la volonte de celui qui opère.

Pour remedier à ce que la planche puisse se presenter aux outils avec la moindre courbure, je me sers d'une pesée dont le poids posé par une roulette, sur la planche, à l'endroit ou elle va commencer à être entaillée. On peut par un mouvement de pied ou autre, accroitre ou diminuer le poids, en faisant glisser le poids de droite à gauche ou de gauche à droite, suivant le besoin. Cette pesée ressemble assez à une ancienne Romaine, sur laquelle le même poids sert, par un mouvement en avant ou retrograde, à reconnaitre la pesanteur d'un objet quelconque, avec la simple difference pourtant que le support y est placé entre le poids et l'objet à pese, tandis qu'ici le levier est fixé derrière et que c'est la roulette qui forme le point d'appui. On peut egalement faire l'application de tout autre systeme de pese, moi même j'en ai employé un autre à l'une de mes tables, ou j'ai renferme tout le mecanisme dans un cyl-

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indre de 18 pouces seulement, au moyen de deux ouvertures d'environ deux pouces de hauteur de chaque côté du cylindre; le bois entre brut et sort perfectionné du cylindre, dans lequel sont concentres tous les ustensiles du travail, et que personne ne voit: un jour est reserve en dessous pour laisser echapper la moulure que produisent les scies circulaires.

On obtient par la même machine, sur les bouts des planches la même operation qui vient d'être decrite pour les côtés, quelque soit le faux equerre que l'on desire donner aux pieces, tout le secret alors consiste dans la direction à donner au chariot qui apporte le bois à la rencontre des outils.

Je crois inutile de décrire minutieusement la charpente sur laquelle sont etablis les ustensiles, l'especе, la pose, et la dimension des divers rouages, parceque c'est au constructeur à calculer les mouvements qui doivent produire les effects demandés, et à prevenir que l'action de quelque partie ne s'oppose au jeu d'une autre.

Il est inutile de dire, après le titre de cette description, que tout y être calculé pour qu' avec la même machine, on puisse egalement bouveter des planches de toutes largeurs, épaisseurs et longueurs. Ainsi les scies les bouvets ou porte outils, &c., doivent nécessairement s'ecarter, se rapprocher, se lever, se baisser et les sues B C, s'obliquer en sens inverse, suivant le besoin.

La machine de mon invention que je décris, réunit tous ces avantages, et peut facilement, servie par un seul homme qui' aura les bois à proximité, operer en douze heures, sur deux à trois mille pieds de planches.

Pour blanchir ou reduire d'epaisseur la planche A (pl. 4.)

On la présente à champ sur les roulettes B B B, dont les axes sont placés horizontalement.

Deux cylindres C D, canneles, placés verticalement et parallelement entre eux pressent la planche des deux côtés; les fontaines, de l'un C sont fixés, celles de l'autre D sont mobiles dans des coulisses pour répondre à la variation des epaisseurs des bois qu'on veut blanchir. L'effet d'un ressort un d'un poids sur les derrier fontaines, determine une pressure egale et constante des cylindres contre la planche.

Deux porte outils armés de planes E H à deux fers obliquement posés et en sens invers, sont mus en evant et en arrieré par un double vilbrequin F sur lequel est fixé à l'une des extremitiés la roue motrice G E, l'un des ces porte outils (qui font un mouvement précipite en avant et retrograde) ne doit pas plus monter ou descendre que ecarter on s'approcher de la planche A; c'est celle-ci qui vient le chercher, tandis qu'au contraire l'autre H s'ecarte et se rapproche au besoin.

Lorsque la planche se trouve atteinte et reduite à l'epaisseur voulue le porte-outil H rencontre des roulettes sur lesquelles il frotte, et qui émpechent les ferrements de mordre plus avant dans la planche. Les roulettes doivent être montées de maniére à pouvoir s'avancer ou se reculer, puisque c'est de leur écartement que depend l'epaisseur

qu'auront les bois; des reports ou des poids aménent graduellement le porte-outil H à la rencontre de la planche.

Outre les deux cylindres C D dont il vient d'être parlé, il y en a deux autres J L à l'extremite des chassis egalement placés verticalement, mais ils sont fixés dans leurs fontaines, parceque, lorsque la planche leur arrive, elle a subi toute son operation: elle est alors reduite à l'epaisseur voulue et n'a besoin de ces derniers cylindres que pour diriger se sortie après quelle a quitté les cylindres introducteurs C D.

Tous les cylindres portent en tête chacun une roue, M N O P, dont le diametre doit être calculé sur l'epaisseur du bois qu'on travaillée les deux premières M N engrenent ensemble et les deux dernières O P de même.

Au dessus de chacune des rous N et P est placée, soit une roue dentelée pour une chaine à la Vuacanson, ou bien un triple vilbrequin Q R qui servent au moyen d'une ville à faire mouvoir à la main les quatre cylindres ensemble. Ce sont les deux premiers C D qui conduisent la planche au travail.

Paris, le 18 Decembre, 1824.

(Signé) DE MANNEVILLE.

MINISTERE DE L'INTERIEUR.

Comité consultatif des arts et manufactures.

Séance du 2 Avril, 1825.

Le Sr. de Manneville demande un certificat d'addition et de perfectionnement au brevet d'invention de 15 ans qui lui a éte délivré le 9 Mars, 1825, pour des machines destinées à bouveter les planches destinées à faire des parquets.

L'explication fournie par le pétitionnaire à l'appui de sa demande étant suffisamment claire, nous pensons que le certificat peut être expedie.

(Signé) ROARD,
THENARD,
GUILLARD SENAINVILLE.

28 Avril, 1825.

Brevet d'addition et de perfectionnement. Dans la description de mes moyens d'exécution deposée à Paris au secretariat du département le 18 X'bre, 1824, ou je crains de n'avoir pas été assez explicite, j'ai dit: "la planche qu'on veut bouveter est préalablement bien assujettie sur un chariot, marchant entre des conducteurs qui ne lui permettent de variation en aucun sens, et qui apporte le bois au travail conformément à la volonté de celui qui opére." Alors j'entendais parler d'un chariot (conduisant le bois au travers du cylindre) qu'on etait obligé, après en avoir détaché le bois ouvragé, de ramener chaque fois à sa première position, pour y recevoir de nouveau du bois à ouvrager, ce

qui occasionnait nécessairement une perte de temps, qu'il est intéressant de prévenir.

Ce systeme auquel je ne renonce pourtant pas pour certains ouvrages, avait l'inconvenient d'obliger l'ouvrier, à chaque pièce de bois qu'il bouvetait de se deplacer deux fois: d'abord il lui fallait fixer sa pièce sur le chariot en avant du cylindre, puis aller en arriére de celui-ci detacher la piéce ouvragée du chariot et revenir ensuite au devant pour ramener le chariot à sa première position, afin d'y recevoir de nouveau bois. Cette maniere d'opérer condamnait l'ouvrier à une action perpétuelle, le fatiguait, et lui occasionnait une perte de temps considerable. Pour remedier à cela, il aurait fallu deux ouvriers au lieu d'un. L'un en avant l'autre en arrière du cylindre d'où il serait resulté un accroissement dans les frais de main d'œuvre de cent pour cent. J'ai maintenant trouvé un moyen qui dispense de toute operation en arrière du cylindre, economise beaucoup de temps, et simplifie infiniment l'operation. Voici en quoi consiste ce perfectionnement pour lequel, je reclame un privilège de quinze ans.

Le conducteur, qui d'abord était d'une pièce comme presque tous les conducteurs, est formé aujourd'hui de nombre de petites parties de 2, 4, ou 6 pouces de long plus on moins jointes par des charnières et formant alors un tout parfaitement egal de largeur et d'epaisseur. Chacune de ces divisions porte une creimaillière et aussi un ou deux trous carres plus larges en dessous qu'en dessus, dans lesquels se trouvent logées les têtes des boulous qui serrent les valets. C'est en reunissant cette partie separée que je compose une espèce de chaine, qui etant parfaitement contenue dans sa marche entre des guides bien appropries forme mon nouveau chariot. Lorsque ce chariot a traverse le cylindre, et que par consequent le bois a subi son operation et se ploye par l'effect de son propre poids, et se trouve par le seul jeu des charnières degage de dessous les vallets, tombe à terre et chaque maille du cariot reployee en dessous de la mecanique vient alternativement reprendre sa première place au devant du cylindre, pour y recevoir de nouveaux bois de la main de l'ouvrier dont l'unique occupation aujourd'hui, est de placer constamment du bois neuf sous les valets tandis que le bouveteur travaille activement et à lui seul les joints, la languette, la rainure, et se debarasse du bois à mesure qu'il est ouvrage.

Je crois utile d'expliquer que l'un de mes moyens de pression employée sur le bois dont j'ai entendu parler dans ma description du 18 X'bre dernier, est un resort portant aux extremités un galet, avec des joues d'un diamètre d'un moins un pouce en sus du galet, afin que les joues seules appuent sur le bois, et que ce galet puisse passer par dessus les boulons et les ecrous des valets sans y toucher aucunement, ce qui contrarierait la pression régulière que ces joues doivent constamment produire sur le bois.

J'aurais du dire aussi, qu'au moyen de l'outil qui plane et blanchit, on peut également produire toutes espèces de moulures sur le bois, il ne s'agit pour cela que d'edapter à la place des planes aux porte-outils

E H des tranchants ou des fraises, répondent à la figure que l'on veut sculpter sur le bois.

Paris, le 26 Fevrier, 1825.

(Signé) THOMAS DE MANNEVILLE.

Three erasures made in the above before signing.

[*Witness:*] JOHN BARTLY.

A. PERPIGNA.

At the execution of a commission for the examination of witnesses, between Artemas L. Brooks and others, complainants, in equity, versus John Fiske and another, respondents, this paper writing was produced and shown to Antoine Perpigna, and by him deposed unto at the time of his examination, and signed by said witness to identify the same.

Before the undersigned.

ROBERT WALSH, [L. S.]
Consul and Commissioner.

Paris, 17th February, 1851.

Exhibit A.

The United States Patent office, to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy of the record of letters patent granted to William Woodworth the twenty-seventh of December, eighteen hundred and twenty-eight.

In testimony whereof I, D. C. Laurence, acting commissioner of patents, have caused the seal of the Patent office to be hereunto affixed, this twelfth day of February, in the year of our Lord one thousand eight hundred and fifty, and of the independence of the United States the seventy-fourth.

[SEAL.] DEWITT C. LAURENCE.

The schedule referred to in these letters patent, and making part of the same, containing a description, in the words of the said William Woodworth himself, of his improvement in the method of planing, tongueing, grooving, and cutting into mouldings *or* either plank, boards, or any other material, and for reducing the same to an equal width and thickness, and also for facing and dressing brick, and cutting mouldings on, or facing metallic, mineral, or other substances.

The plank, boards, or other material, being reduced to a width by circular saws, or friction wheels, as the case may be, is then placed on a carriage, resting on a platform, with a rotary cutting wheel in the centre, either horizontal or vertical. The heads or circular plates fixed to an axis may have one of the heads moveable, to accommodate any length of knife required. The knife fitted to the heads with screws or

bolts; or the knives or cutters for moulding fitted by screws or bolts to logs connecting the heads of the cylinder, and forming, with the edges of the knives or cutters, a cylinder. The knives may be placed in a line with the axis of the cylinder or diagonally.

The plank or other material resting on the carriage may be set so as to reduce it to any thickness required, and the carriage, moving by a rack and pinion, or rollers, or any lateral motion, to the edge of the knives or cutters on the periphery of the cylinder or wheel, reduces it to any given thickness. After passing the planing and reducing wheels, it then approaches, if required, two revolving cutter wheels, one for cutting the groove and the other for cutting the rabbets that form the tongue; one wheel is placed directly over the other, and the lateral motion moving the plank or other material between the grooving and rabbeting wheels, so that one edge has a groove cut the whole length, and the other edge a rabbet cut on each side, leaving a tongue to match the groove. The grooving wheel is a circular plate, fixed on an axis, with a number of cutters attached to it, to project beyond the periphery of the plate, so that when put in motion will perform a deep cut or groove parallel with the face of the plank or other material. The rabbeting wheel, also of similar form, having a number of cutters on each side of the plate, projecting like those on the grooving wheel, cuts the rabbet on each side of the edge of the plank, and leaves the tongue or match for the groove. By placing the planing wheel, axis, and cutter knives vertical, the same wheel will plane two planks or other material in the same time of one, by moving the plank or other material opposite ways, and parallel with each other, against the periphery of the planing or moulding wheel. The groove and tongue may be cut in the plank or other material at the same time by adding a grooving and rabbeting wheel. Said William Woodworth does not claim the invention of circular saws or cutter wheels, knowing they have long been in use; but he claims as his invention the improvement and application of cutter or planing wheels to planing boards, plank, timber, or other material; also, his improved method of cutters for grooving and tongueing, and cutting mouldings on wood, stone, iron, metal, or other material; and also for facing and dressing brick, as all the wheels may be used single and separately for moulding, or any other purpose before indicated. He also claims as his improved method the application of circular saws for reducing floor plank and other materials to a width.

Dated Troy, Dec. 4, 1828.

WILLIAM WOODWORTH.

Witnesses:
HENRY EVERTS,
D. S. GLEASON.

(Rec'd, and recorded anew, August 26th, 1842.)

Witnesses names: Henry R. Dunham, Thomas W. Harvey, J. B. Stillman, Henry R. Worthington, Henry R. Dunham, J. Ericsson.

I hereby certify that the annexed paper constitutes exhibit A, testified to by the various witnesses examined before me, under a commission issued to me out of and under the seal of the circuit court of the United States, for the district of Massachusetts, in a suit therein pending between Artemas L. Brooks et al., complainants, and John Fiske et al., respondents, on part of respondents, the same having been produced and shown to said several witnesses at the time of their examination, and signed by them to identify the same.

WILLIAM DODGE, *Commissioner.*

New York, April 5, 1851.

EXHIBIT B.

United States Patent Office.

To all persons to whom these presents shall come, greeting:

This is to certify, that the annexed is a true copy of the record of letters patent granted to William Woodworth, the twenty-seventh of December, eighteen hundred and twenty-eight, as reissued the eighth of July, eighteen hundred and forty-five, with certificate of extension appended.

In testimony whereof, I, D. C. Laurence, acting commissioner of patents, have caused the seal of the Patent office to be hereunto affixed, this twelfth day of February, in the year of our Lord one thousand eight hundred and fifty, and of the independence of the United States the seventy-fourth.

[SEAL.] DEWITT C. LAURENCE.

The schedule referred to in these letters patent, and making part of the same.

To all whom it may concern: Be it known, that the following is a full, clear, and exact description of the method of planing, tongueing, and grooving plank or boards, invented by William Woodworth, deceased, and for which letters patent of the United States were granted to him on the 27th day of December, in the year one thousand eight hundred and twenty-eight; the said letters patent having been surrendered for the purpose of describing the same invention, and pointing out in what it consists in more clear, full, and exact terms than was done in the original specification.

The plank, or boards, which are to be planed, tongued, and grooved, are first to be reduced to a width by means of circular saws, by reducing wheels, or by any other means. When circular saws are to be used for this purpose, two such saws should be placed upon the same shaft on which they are to be capable of adjustment, so that they may be made to stand at any required distance apart; under these, the board or plank is to be forced forward, and brought to the width required. This apparatus and process do not require to be further explained, they

being well understood by mechanicians. When what has been above denominated reducing wheels are used, these are to consist of revolving cutter wheels, which resemble, in their construction and action, the planing and reducing wheel to be presently described; these are to be made adjustable, like the circular saws; but the latter are preferred for this purpose. The plank may be reduced to a width on a separate machine. When the plank, or boards, have been thus prepared (on a separate machine) they may be placed on or against a suitable carriage, resting on a frame or platform, so as to be acted upon by a rotary, cutting, or planing and reducing wheel, which wheel may be made to revolve either horizontally or vertically, as may be preferred. The carriage which sustains the plank or board to be operated upon, may be moved forwards by means of a rack and pinion, by an endless chain or band, by geared friction rollers, or by any of the devices well known to machinists for advancing a carriage, or materials to be acted upon in machines for various purposes. The plank or board is to be moved on towards the cutting edges of the cutters or knives on the planing cylinder, so that its knives or cutters, as they revolve, may meet and cut the plank or board in a direction contrary to that in which it is made to advance; the edges of the cutters are in this method prevented from coming first into contact with its surface, and are made to cut upwards from the reduced part of the plank towards said surface; by which means their edges are protected from injury by gritty matter, and the board or plank is more evenly and better planed than when moved in the reverse direction.

After the board or plank passes the planing cylinder, and as soon or fast as the planing cylinder has done its work on any part of the board or plank, the edges are brought into contact with two revolving cutter wheels, one of which is adapted to the cutting of the groove, and the other to the cutting of the two rebates that form the tongue. When the axis of the planing and reducing wheel stands vertically, the grooving and tongueing wheels are placed one above the other, with the plank edgewise between them. When the axis of the planing wheel stands horizontally, these wheels are on the same horizontal plane with each other standing on perpendicular spindles.

The grooving wheel consists of a circular plate fixed on an axis, and having one, two, three, four, or more cutters, which are to be screwed, bolted, or otherwise attached to it, the edges of which cutters project beyond the periphery of the plate to such distance as is required for the depth of the groove; their thickness may be such as is necessary for its width. They are of course so situated as to cut the groove in the middle of the edge of the board, or as nearly so as may be required. The tongueing wheel is similar in form to the grooving wheel, but it has cutters on each of its sides, or otherwise so formed and arranged as to cut the two rebates which are necessary to the formation of the tongue. The grooving and tongueing cutters, at the same time, and by the same operation, reduce the board or planks to an exact width throughout. When the axis of the planing wheel is placed verti-

cally, the knives or cutters, may be made to plane two planks at the same time; the planks being in this case moved in contrary directions, and so as to meet the edges of the revolving knives or cutters. When the machine is thus constructed, a second pair of grooving and tongueing wheels may be made to operate in the same way with those above described. A machine to operate upon a single plank or board, and having the axis of the planing wheel placed horizontally will, however, be more simple and less expensive than that intended to operate on two planks simultaneously.

In the accompanying drawings, fig. 1 is a perspective representation of the principal operating parts of the machine when arranged and combined for planing, tongueing, and grooving; and when so arranged as to be capable of planing two plank at the same time, the axis of the planing wheel being placed vertically. A, A, is a stout, substantial frame of the machine, which may be of wood, or of iron, and may be varied in length, size, and strength, according to the work to be done. B, B, are the heads of the planing cylinder, and C, C, the knives or cutters, which extend from one to the other of said heads, to the peripheries of which they may be attached by means of screws. The knives C, C, with the faces forming a planing angle, may be placed in a line with the axis J, of the cylinder, or they may stand obliquely thereto, as may be preferred; but in the latter case the edge should form the segment or portion of a helix; *b*, represents a pulley near to the upper end of the axis J; and I, a pulley or drum, which may be made to revolve by horse, steam, or other motive power, and from which a belt may extend around the pulley *b*, to drive the planing cylinder, and other parts of the machinery. G, is the carriage, which is represented as being driven forward by means of a rack and pinion H; against this carriage, the plank K, which is to be planed, tongued, and grooved, is placed, and is made to advance with it. It will be manifest, however, that the plank may be moved forward by other means; as, for example, by an endless chain or band passing around drums or chain wheels, or by means of geared friction wheels borne up against it. To cause the carriage and plank to move forward readily, there may be friction rollers, *f*, *f*, *f*, placed horizontally, and extending under them. The rollers f^1, f^1, f^1, which stand vertically, are to be made to press against the plank, and keep it close to the carriage, and thus prevent the action of the cutters from drawing the plank up from its bed in cutting from the planed surface upwards; they may be borne against it by means of weights, or springs, in a manner well know to machinists. In a single horizontal machine the horizontal friction rollers may be geared, and the pressure rollers placed above them to feed the board, with or without the carriages, a bed plate being used directly under the planing cylinder.

Fig. 2, is a separate view of the planing cylinder with its knives or cutters, and fig. 3, an end view of one of the heads. E^1, E^1, are the revolving cutter or tongueing and grooving wheels, and D, D, whirls

upon their shafts, which may be driven by bands or otherwise, so as to cause said wheels to revolve in their proper direction.

Fig. 4, is a side view of one of these wheels. Fig. 5, is an edge view of the tongueing wheel, and fig. 6, an edge view of the grooving wheel, the two latter being each shown with two cutters in place. The number of cutters on these wheels may varied, but they are represented as furnished with four. The cutters may be fixed on the sides of circular plates, with their edges projecting beyond the periphery of said plate.

The edges of the plank, as its planed part passes the planing cylinder, are brought into contact with the above described tongueing and grooving wheels, which are so placed upon their shafts as that the tongue and groove shall be left at the proper distance from the face of the plank, the latter being sustained against the planing cylinder by means of the carriage, or bed plate, or otherwise, so that it cannot deviate, but must be reduced to a proper thickness, and correctly tongued and grooved.

In fig. 1, above referred to, only one carriage and one pair of cutter wheels are shown, it not being deemed necessary to represent those on the opposite side, they being similar in all respects.

Fig. 7, represents the same machine, with the axis of the planing cylinder placed horizontally, and intended to operate on one plank only at the same time; A, A, is the frame; B, B, the heads of the planing cylinder; C, C, the knives or cutters attached to said heads; to meet the different thicknesses of the plank or boards, the bearings of the shaft of the cylinder may be made moveable by screws or other means to adjust it to the work, or the carriage or bed plate may be made so as to raise the board or plank up to the planing cylinder. E and E^1, are the revolving cutters or tongueing and grooving wheels, which are placed upon vertical shafts, having upon them pulleys, D, D, around which pass belts or bands from the main drum, I, to which a revolving motion may be given by any adequate motive power.

From the drum, I, a belt, L, passes also around the pulley, *b*, on the shaft of the planing cylinder, and gives to it the requisite motion. There may, in this machine, be a horizontal carriage moved forward by a rack and pinion, in manner analogous to that represented in fig. 1, but in the present instance the plank is supposed to be advanced by means of one or two pairs of friction or feed rollers, shown at *f*, *f*^{1}; the uppermost *f*^{1}, *f*^{1}, of the pairs of rollers may be held down by springs or weighted levers, which it has not been thought necessary to show in this drawing, as such are in common use. The lowermost of these rollers may be fluted or made rough on their surfaces, so as to cause friction. On the underside of the plank, M, M^1, are pulleys on the axles of these lower rollers, which are embraced by bands, N, N^1, which also pass around a pully, O, on a shaft which crosses the frame, A, A, and has a pulley, T, on it, which is embraced by the belt, P, on a pulley, Q, on the shaft of the main drum, I. These bands and pullies serve to give motion to the feed rollers, as will be readily understood

by inspecting the drawing. R, R, are guide strips, used in place of the rollers, used for the same purpose; and also for bearing or friction rollers when the machine is vertical to direct one edge of the plank, and against its opposite edge; any pressure may be used equal to the weight of the board or plank when worked in a vertical position. One of the cutter wheels shall be made adjustable, to adapt it to stuff of different widths.

The planing cylinder, and likewise the cutter or tongueing and grooving wheels, may be constructed in the manner represented in figs. 2, 3, 4, 5, and 6, and herein before fully described. One of the heads of the planing wheel may be made moveable to accommodate its length to the width of the board or plank to be planed.

The respective parts of this machine may be varied in size, as may also the velocity of the motion of the planing cylinder and cutter wheels, but the following has been found to answer well in practice: The planing cylinder, having four knives or cutters, may be twelve inches in diameter, and may make two thousand and upwards revolutions in a minute. In a machine like that shown in fig. 7, the main drum, I, may be two feet in diameter, and may be driven with the speed of five hundred and upwards revolutions in a minute. The pullies on the planing cylinder and on the cutter wheels may be six inches in diameter. The plank should be moved forward at the rate of about one foot for every hundred revolutions of the cutter wheel, and of course the diameter of the feed rollers, and of the pulleys by which they are turned, must be so graduated as to produce this result. The size and speed of the above parts of this machine may be in some degree varied, but the above have been found to work well.

Having thus fully described the parts and combinations of parts, and operation of the machine for planing, tongueing and grooving boards or plank, and shown various modes in which the same may be constructed, and made to operate without changing the principle or mode of operation of the machine, what is claimed therein, as the invention of William Woodworth, deceased, is the employment of rotary planes, substantially such as herein described, in combination with rollers, or any analogous device, to prevent the boards from being drawn up by the planes, when cutting upwards, or from the reduced or planed, to the unplaned surface, as described.

And also the combination of the rotating planes with the cutter wheels, for tongueing and grooving, for the purpose of planing, tongueing and grooving boards, &c., at one operation, as described.

And also the combination of the tongueing and grooving cutter wheels, for tongueing and grooving boards, &c., at one operation, as described.

And, finally, the combination of either the tongueing or the grooving cutter wheel, for tongueing or grooving boards, &c., with the pressure rollers, as described; the effect of the pressure rollers in these operations being such as to keep the boards, &c., steady, and prevent the cutters from drawing the boards towards the centre of the cutter wheels,

whilst it is moved through by machinery. In the planing operation, the tendency of the plane is to lift the boards directly up against the rollers; but in the tongueing and grooving, the tendency is to overcome the friction occasioned by the pressure of the rollers.

WILLIAM W. WOODWORTH,
Administrator of William Woodworth, deceased.

Witnesses—
JAMES MILHOLLAND,
CHAS. M. KELLER.

Thos. W. Harvey, J. B. Stillman, Henry R. Worthington, Henry R. Dunham, J. Ericsson.

At the execution of a commission for the examination of witnesses, between Artemas L. Brooks and others, complainants, and John Fiske and another, respondents, the within papers and drawings, which I have marked exhibit B, were produced and shown to the several witnesses whose names are above written, and by them deposed unto at the time of their examination, and signed by the said witnesses as above, to identify the same. WILLIAM DODGE,

NEW YORK, *April* 5, 1851. *Commissioner.*

[For diagrams, see original, pages 79, 80, 81, 82, 83, 84, and 85.]

And afterwards, at this present term, to wit, on this fifteenth day of March, A. D. 1852, the following decree is made by the court, which is in the words following, to wit:

Circuit court of the United States, Massachusetts district, October term, 1851.

ARTEMAS L. BROOKS et al.
vs.
JOHN FISKE et al.
} In equity.

This cause came on to be heard upon the bill, answer, and general replication, and the proofs taken therein, and was argued by counsel; upon consideration whereof, it is adjudged by the court, that the machine made and used by the defendants, and complained of in the said bill, is not an infringement of the right secured to the complainants under and by virtue of the letters patent reissued and granted to William W. Woodworth, administrator, on the eighth day of July, in the year one thousand eight hundred and forty-five, referred to in the said bill, and under and by virtue of the several mesne conveyances recited in the said bill; and thereupon the court doth order, adjudge, and decree, that the complainants' said bill be, and the same hereby is, dismissed with costs.

By the court: ISAAC O. BARNES, *Clerk.*

Whereupon the complainants prayed to be allowed an appeal to the Supreme Court of the United States, which was ordered in the words following, to wit:

Circuit court of the United States. October term, 1852.

MASSACHUSETTS DISTRICT, *ss.*

ARTEMAS L. BROOKS and al.
vs.
JOHN FISKE and al. } In equity.

And now the complainants in the above entitled cause having prayed to be allowed an appeal from the final decree dismissing this bill, and it appearing to the court that it is reasonable that the appeal should be allowed, it is ordered by the court that the same be, and it hereby is, allowed.

By the court:

ISAAC O. BARNES, *Clerk.*

UNITED STATES OF AMERICA,
Massachusetts district, ss.

I, Isaac O. Barnes, clerk of the circuit court of the United States, for the first circuit, Massachusetts district, do hereby certify, that the foregoing is a true copy of the record of the case of Artemas L. Brooks and al., in equity, vs. John Fiske and al.

In testimony whereof I have hereunto subscribed my name, and affixed the seal of the said court, at Boston, this twenty-fourth [L. S.] day of April, A. D. 1852, and in the seventy-sixth year of the independence of the United States of America.

ISAAC O. BARNES, *Clerk.*